

Savvy A
MODERN SYSTEM
OF
NATURAL HISTORY.

CONTAINING
Accurate Descriptions, and faithful Histories,
OF
ANIMALS, VEGETABLES, and MINERALS.

Together with
Their Properties, and various Uses in MEDICINE,
MECHANICS, MANUFACTURES, &c.

Illustrated
With a great Variety of COPPER-PLATES, accurately
drawn from Nature, and beautifully engraved.

By the Rev. SAMUEL WARD,
Vicar of Cotterstock, cum Glapthorne, Northamp-
tonshire; and others.

V O L. IX.

*The great Creator did not bestow so much Curiosity and
Workmanship upon his Creatures to be looked upon with a
careless incurious Eye.*

Derham's Physf. Theol. Book xi.

L O N D O N :
Printed for E. NEWBERRY, the Corner of St. Paul's
Church-yard, Ludgate-street. 1776.



THE
NATURAL HISTORY
OF
FISHES.

ILLUSTRATED

With a great Variety of COPPER-PLATES, accurately drawn from Nature, and beautifully engraved.

By the Rev. SAMUEL WARD,
Vicar of Cotterstock, cum Glapthorne, Northamptonshire.

VOL. I.

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THE
NATURAL HISTORY
OF
FISHES.

OF FISHES IN GENERAL.

THE great receptacle of fishes is the ocean; and some have imagined, that all fish are naturally of that salt element, and that they have accidentally migrated into fresh water. At this time, some of them swim up rivers to deposit their spawn; but the great body of fishes keep to the ocean, and would quickly expire in fresh water. In that extensive abode millions reside, whose very form is a secret to us. The curiosities, and the wants of mankind, have, indeed, forced many from their depths: with the figure of these they are acquainted, but for their pursuits, habits,

and manners of gestation, these are all hidden in the turbulent element which they inhabit.

According to Linnæus, the number of fish, whose names and figures we are in some degree acquainted with, somewhat exceeds four hundred. Most of them have the same external form; sharp at each end, and swelling in the middle; which enables them, with greater celerity and ease, to traverse the fluid which they inhabit. That peculiar shape which nature has granted to most fishes, human art has endeavoured to imitate in such vessels as are designed to sail with the greatest swiftness; but the progress of such a machine is nothing, compared to the rapidity of an animal. Any of the larger kind of fish can easily overtake a ship in full sail, play round it without any uncommon exertion, and swim before it at pleasure.

The fins are the chief instruments in the motion of a fish: in some they are much more numerous than in others. A fish completely equipped for sailing, is furnished with two pair, and three single fins, two above and one below. Thus qualified, it migrates with the utmost rapidity, and takes voyages of a thousand leagues

leagues in a season : but those fish that have the greatest number of fins, have not always the swiftest motion ; the shark, for example, is destitute of the ventral or belly fins, though it is thought to be one of the swiftest swimmers ; and the haddock, though completely fitted for swimming, is less rapid in its motion.

Besides assisting the animal in progression, the fins are useful in rising, or sinking, in turning, or even leaping out of the water. The pectoral fins, like oars, serve to push the animal forward ; they are placed a little behind the opening of the gills, and are generally large and strong, answering the same purposes to all fish in the water, as wings do to a bird in its proper element. By the continued motion of these, the flying fish sometimes rises out of the water, and flies above an hundred yards, till, fatigued with its exertions, it falls again into the ocean. The ventral fins are placed under the belly, towards the lower part of the body. Whatever may be the situation of the fish, these are always seen to lie flat on the water, and rather serve to raise or depress the fish in its element, than assist progressive motion. The dorsal fin is situated along the ridge of the
the

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the back, and not only serves to keep the fish in equilibrio, but also to assist in its progressive motion. Many fishes are destitute of this fin, but it is very large in all flat fish, which have the pectoral fins proportionably smaller. The anal fin occupies that part between the anus and the tail, and serves to support the fish in its upright situation.

The tail, which is upright in some fishes, and flat in others, appears to be the grand instrument of motion; the fins being only subservient to it. If the fish is inclined to turn, a stroke with the tail sends it about; but, if the tail strikes both ways, the motion is progressive. If the dorsal and ventral fins of the fish be cut off, it reels to the right and left. If it loses the right pectoral fin, it bears on that side: if the ventral fin on the same side be cut away, it loses its equilibrium entirely: but, when the tail is cut off, it is deprived of all motion, and is driven along with the current of the water.

It is certain, however, that the number, the size, and the situation of the fins, seem rather to correspond with the animal's figure, than entirely to answer the purposes of promoting its speed. If the head of the fish is large and heavy,
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the pectoral fins are large, and placed forward, to prevent its over-setting. If the head of the fish is small, sharp-pointed, and not too heavy for the tail, its pectoral fins are small, and it is totally destitute of the ventral fins.

Land animals are generally furnished with a covering to keep off the injuries of the weather, so the inhabitants of the water are covered with a slimy glutinous matter, that defends their bodies from the immediate contact of the surrounding fluid, and assists them in their easy progress through the water. Beneath this, in many kinds, a strong covering of scales is found, which, like a coat of mail, still more powerfully defends it.

But, though the fish seems as well furnished with the means of happiness, as quadrupedes or birds; yet, on a close examination of its faculties, we shall find it greatly their inferior. The sense of touching, which is enjoyed in some degree by beasts and birds; the fish, covered up in its own coat of mail, can have but little acquaintance with.

The sense of smelling, so exquisite in beasts, and known a little among birds, is given to fishes in a very moderate degree. All fishes indeed have one or more
nos.

nostrils; but as air is the only medium we know for the distribution of odours, it cannot be supposed that these inhabitants of the water can be possessed of any power of being affected by them. If they have any perception of smells, it must be in the same manner as we distinguish by our taste; and the olfactory membrane in fish serves them, perhaps, instead of a distinguishing palate.

The sense of tasting is very defective among fishes; the palate of most of them is hard and bony, and consequently incapable of the powers of relishing different substances: these voracious animals have been often seen to swallow the fisherman's plummet instead of the bait.

The sense of hearing, fishes are entire strangers to, or they possess it in a very imperfect and limited degree. It is certain, however, that anatomists have not been able to discover, except in the whale kind, the smallest traces of an organ about the head of fishes. To what purpose, indeed, should this sense be given to animals that are incapable of making themselves heard? Having no voice to communicate with each other, they consequently have no necessity for an organ of hearing. We are told by
Mr.

Mr. Gouan, who kept some gold fishes in a vase, that, whatever noise he made, he could not disturb or alarm them. He hallowed as loud as he was able, and the fishes still appeared insensible: it is necessary to be observed, indeed, that he placed a piece of paper between his mouth and the water, to prevent the vibrations from affecting the surface; and when the paper was removed, and the sound had its full scope upon the water, the fishes instantly seemed terrified, and shrunk to the bottom. From this, and many other experiments, it is generally believed, that fishes are as deaf as they are mute.

Fishes are in a tolerable degree possessed of the sense of seeing; and yet, if we compare it to that of other animals, even this appears obscure. The eyes of most fish are covered with the same transparent skin that covers the rest of the head, which nature seems to have furnished to defend them in the water, as they are without eye-lids. The chrystaline humour, which in quadrupedes is flat, in fishes is perfectly round, or sometimes in the shape of an egg. Hence it appears, that fish are extremely near-sighted, and that they can see objects but at a very small distance, even in the water.

It

It is indeed very apparent, that fish are far behind terrestrial animals in their sensations, and consequently in their enjoyments. Nature seems to have fitted them with appetites and powers of an inferior kind, and formed them for a sort of passive existence in the heavy element to which they are consigned: their senses are incapable of making any distinctions, but they move forward in pursuit of whatever they can swallow, conquer or enjoy.

A ceaseless appetite impels them to encounter every danger; and indeed their rapacity seems insatiable. Even when taken out of the water, and almost expiring, they greedily swallow the very bait that allured them to destruction. Their digestive powers seem, in some measure, to encrease with the quantity of food they are supplied with. But though their appetites are ever craving, no animals can endure the want of food for so long a time. Gold and silver fishes, which are kept in vases, are often seen for months without apparent sustenance: whether they feed on the water-insects, which are too minute for observation, or whether water alone is a sufficient supply, is not evident. Even the
pike,

pike, one of the most voracious of fishes, will live in a pond where there is none but himself.

Fishes that have very small mouths feed upon worms, and the spawn of others; some that have larger mouths, seek larger prey. Those with the largest mouths pursue almost every thing that has life. The life of a fish, from the smallest to the greatest, is indeed but one scene of hostility, violence, and evasion. The smaller fry, standing no chance in the unequal combat, escape into those shallows where the greater are unable to pursue. There they become invaders in turn, and feed upon the spawn of the larger fish, which floats upon the surface of the water: yet, even in the shallows, they are beset with dangers; the muscle, the oyster, and the scallop, lie in ambush at the bottom, with their shells open, to receive the inadvertent wanderers, imprison them by closing their shells, and prey upon them at their leisure.

The pursuit of fishes is not, like that of terrestrial animals, confined to a single region, or to a single effort: shoals of one species follow those of another through vast tracts of ocean, from the pole even down to the equator. The

cod pursues the whiting even from the banks of Newfoundland to the southern shores of Spain. Thus the cachelot pursues a shoal of herrings, and swallows thousands at a gulp.

Though this may be one cause of the annual migration of fishes, yet many are induced to change the place of their residence for one more suited to their constitutions, or more adapted to depositing their spawn. None of them delight in very cold water, but generally frequent those places where it is warmest. In summer they abound in the shallows near the shore, where the sun has power to warm the water to the bottom; but in winter they frequent the greatest depths of the sea, where the cold of the atmosphere is not sufficiently penetrating to reach them. Fresh-water fishes are often seen dead after severe frosts, which have been killed by the severity of the cold, or by their being excluded from air by the ice.

Though all fish live in the water, yet they all require air for their support. Those of the whale kind breathe the air in the same manner that we do, and come almost every minute to the surface to take a fresh inspiration: but those which remain

main entirely under water, must be supplied with air, or they will expire in a very short time. When the ice covers the whole surface of a pond, and thus keeps off the air from the subjacent fluid, we sometimes find the fish are all destroyed.

In every light we have hitherto considered fish, they appear inferior to land animals; in the simplicity of their conformation, in their senses, and their enjoyments; but, as some degree of compensation, they enjoy that humble existence a much longer term than any other class of animated nature. We are told, by Bacon, that, “ Most of the disorders
“ incident to mankind arise from the
“ changes and alterations of the atmosphere; but fishes reside in an element
“ little subject to change; theirs is an
“ uniform existence; their movements
“ are without effort, and their life without labour. Their bones also, which
“ are united by cartilages, admit of indefinite extension; and the different
“ sizes of animals of the same kind among fishes is very various. They
“ still keep growing; their bodies, instead of suffering the rigidity of age,
“ which is the cause of natural decay in

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“ land-animals, still continue encreas-
“ ing with fresh supplies; and as the
“ body grows, the conduits of life fur-
“ nish their stores in greater abundance.
“ How long a fish, that seems to have
“ scarce any bounds put to its growth,
“ continues to live, is not ascertained;
“ perhaps the life of a man would not
“ be long enough to measure that of the
“ smallest.”

Two methods, which are more inge-
nious than certain, have been devised for
determining the age of fishes; the one
is by the circles of the scales, the other
by the transverse section of the back-
bone. By the first method, when a fish's
scale is examined through a microscope,
it will appear to consist of a number of
circles, one within another: and, as in
trees, their age is known by the number
of circles in the transverse section of
them; so in fishes we discover their age
by the number of circles in every scale,
reckoning one ring for every year. Mr.
Buffon found a carp, which, by this me-
thod of computation, appeared to be up-
wards of an hundred years old. How-
ever incredible this may appear, the ac-
counts of several authors of veracity tend
to confirm the discovery. Gesner men-

tions

tions one of the same age ; and Albertus brings us an instance of one that existed upwards of double that period.

The skate and the ray, having no scales, their ages may be known by the other method, which is, by separating the joints of the back-bone, and then examining the number of rings, which the surface where it was joined exhibits.

We cannot vouch for the certainty of these methods, but we have no reason to doubt the extraordinary age of some fishes. But the fecundity of these animals is more extraordinary than their longevity. Some produce their young alive, and others only eggs : the former are the least prolific, and yet they bring forth in great abundance. The viviparous blenny, for instance, produces two or three hundred at a time, all alive, which immediately divert themselves by playing round the parent. Those which exclude their progeny in eggs, and are obliged to leave them to chance, at the bottom of shallow water, or floating on the surface where it is deeper, are much more prolific ; the stock being in some degree proportioned to the danger there is of its consumption. But very few of these eggs produce an animal, as they are de-

voured by fishes and aquatic birds: still, however, the numbers that escape are sufficient to supply the deep with inhabitants, and to relieve the wants of a very considerable part of mankind.

The number that a single fish is capable of producing appears astonishing: a single cod is said to produce, in one season, as many of its kind, as there are inhabitants in England. Lewenhoeck assures us, that, in one season, the cod spawns above nine million of eggs: the flounder produces above one million, and the mackarel above five hundred thousand. This amazing encrease preserves the species in the midst of innumerable enemies, and furnishes the rest with a sustenance suitable to their nature.

All fishes, except those of the whale kind, are destitute of those parental sollicitudes, which so strongly mark the manners of the greater part of the terrestrial animals. When they have deposited their burthens, they leave their little progeny to shift for themselves. The spawn continues in its egg state, in proportion to the size of the animal. The young of the salmon, for instance, continue in the egg, from the beginning of December till the beginning of April;
those

those of the carp continue in the egg about three weeks ; and the little gold-fish of China is more expeditiously produced ; but, scarce one in a thousand survives the numerous perils of its youth : the very male and female that brought them forth are equally dangerous and formidable with the rest.

There are some fishes, indeed, that possess finer organs, and higher sensations ; that nurse their young with care and tenderness, and protect them from all injuries : the *cetaceous* tribe, or the fishes of the whale kind, are of this kind. The *cartilaginous* kinds, or those which have gristles instead of bones, bring their young alive into the world, and, though not capable of nursing them, defend them with activity and courage. But the fierce regardless tribe that leave their spawn without any protection, are called the *spinous*, or bony kinds ; their bones resembling the sharpness of a thorn.

Thus the three grand divisions in the fish kind are the *tetaceus*, the *cartilaginous*, and the *spinous* ; all differing from each other in their conformation, their appetites, and their production.

Physicians assure us, that fishes afford but very little nourishment as food,
and

and soon corrupt: that they are cold and moist, and consequently produce juices of the same kind, which are ineffectual in strengthening the body: that they abound in a gross sort of oil and water; that they have few volatile particles, and are therefore less fit to be converted into the substance of our bodies.

THE GREENLAND WHALE.

LAND animals, compared with those of the deep with respect to magnitude, appear contemptible in the competition. It is indeed probable, that quadrupedes once existed much larger than those that are to be found at present; for it is evident, from the skeletons of some that have been dug up at different times, that there must have been terrestrial animals twice as large as the elephant: but creatures of such enormous bulk required a proportionable extent of ground for subsistence, and, being rivals with men for large territory, they perhaps have been destroyed in the contest.

This species is the largest animal of which we have any certain information: it is even at present sometimes found in the northern seas ninety feet in length; but

but formerly they were taken of a much greater size; when the captures were less frequent, and the fish had time to grow. Such is their bulk within the arctic circle, but in those of the torrid zone, where they are unmolested, whales are still seen one hundred and sixty feet long.*

It is a large heavy animal, and the head alone makes a third of its bulk: the under lip is much broader than the upper. The tongue is composed of a soft spongy fat, capable of yielding five or six barrels of blubber. The gullet is very small for so vast a fish, not exceeding four inches in width. In the middle of the head are two orifices, through which it spouts water to a vast height, and with a great noise, especially when disturbed or wounded. The eyes are not larger than those of an ox: they are placed towards the back of the head, being the

* Adanson's voy. 174. From this account we find no reason to disbelieve the vast size of the Indian whales, of whose bones and jaws, both Strabo, lib. xv. and Pliny, lib. ix. c. 3. relate, that the natives made their houses, using the jaws for door-cases. This method of building was formerly practised by the inhabitants of Greenland, as we find from Frobisher, in his second voyage, p. 18, published in 1578.

most convenient situation for enabling them to see both before and behind. On the back there is no fin, but on the sides, beneath each eye, are two large ones. The tail is broad and semilunar; and when the fish lies on one side, its blow is tremendous.

This whale varies in colour; the back of some being red, and the belly generally white. Some are black, others mottled, and others quite white, according to the observations of Marten, who says, that their colours in the water are extremely beautiful, and that their skin is very smooth and slippery.

What is called whalebone adheres to the upper jaw of the animal, and is formed of thin parallel laminæ, some of the longest being four yards in length; of these there are commonly three hundred and fifty on each side, and in old fish a great many more; of these about five hundred are of a length proper for use, the others being too short. They are surrounded with long strong hair, not only to prevent their hurting the tongue, but as strainers to prevent the return of their food when they discharge the water out of their mouths.

From

From these hairs Aristotle gave the name of *the bearded whale*, to this species, which he tells us had in its mouth hairs instead of teeth; and Pliny describes the same under the name of *musculus* *. Though the antients were acquainted with these animals, yet it appears they were ignorant of their uses as well as of the method of fishing for them.

Aldrovandus indeed describes from Opi-
pian, what he mistakes for whale fish-
ing: he was deceived by the word *κητος*,
which is used not only to express whale
in general, but any great fish. The
poet here meant the shark, and shews the
way of taking it in the very manner
practised at present, by a strong hook
baited with flesh. He describes too its
three-fold row of teeth, a circumstance
which at once disproves its being a whale:

Whose dreadful teeth in triple order stand,
Like spears out of his mouth.

Though so bulky an animal, the whale
swims with vast swiftness, and gene-
rally against the wind. It brings either
one or two young at a time. Its food is
a certain sort of small snail, and, as Lin-
næus says, the *medusa*, or sea blubber.

* Lib. xi. c. 37.

The great resort of this species is within the arctic circle, but they sometimes visit our coasts. Whether this was the British whale of the antients, we cannot pretend to say, only we find, from a line in Juvenal, that it was of a very large size,

Quanto Delphinis Balœna Britannica
major. Sat. x.

As much as British whales in size
surpass

The dolphin race.

The English were late before they engaged in the whale-fishery: it appears by a set of queries, proposed by an honest merchant in the year 1575, in order to get information in the business, that we were then totally ignorant of it, being obliged to send to “ Biskaie for men skilful in the catching of the whale, and ordering of the oil, and one cooper skilful to set up the staved cask.*” This indeed appears very strange; for by the account Oclher gave of his travels to king Alfred, near seven hundred years before that period, it is evident, that he made that monarch acquainted with the Norwegians practising the whale-fishery;

* Hackluyt's col. voy. i. 414.

but it seems all memory of that profitable employ, as well as of that able voyager Oether, and all his important discoveries in the north, were lost for near seven centuries.

It was carried on by the Biscayeners long before we attempted the trade, not only for the sake of the oil, but also of the whalebone, which they seem to have long trafficked in. The earliest notice we find of that article in our trade is by Hackluyt, who says it was brought from the bay of St. Laurence by an English ship that went there for the *barbes* and *fynnes* of whales and train oil, A. D. 1594, and who found there seven or eight hundred *whale fynnes*, part of the cargo of two great *Biskaine* ships that had been wrecked there three years before. Previous to that, the ladies stays must have been made of split cane, or some tough wood, as Mr. Anderson observes in his Dictionary of Commerce; it being certain, that the whale-fishery was carried on, for the sake of the oil, long before the discovery of the use of whalebone.

The great resort of these animals was found to be on the inhospitable shores of Spitzbergen, and the European ships
C made

made that place their principal fishery, and for numbers of years were very successful : the English commenced that business about the year 1598, and the town of Hull had the honour of first attempting that profitable branch of trade. At present it seems to be on the decline, the quantity of fish being greatly reduced by the constant capture for such a vast length of time : some recent accounts inform us, that the fishers, from a defect of whales, apply themselves to the seal fishery, from which animals they extract an oil. We are also told, that the poor natives of Greenland begin to suffer from the decrease of the seal in their seas, it being their principal subsistence ; so that should it totally desert the coast, the whole nation would be in danger of perishing through want.

In antient times, the whale seems never to have been taken on our coasts, but when it was accidentally flung ashore : it was then deemed a royal fish, and the king and queen divided the spoil ; the king asserting his right to the head, and her majesty to the tail *.

The whale uses the tail only to advance itself forward in the water ; this serves

* Blackston's com. i. c. 4.

as an oar to push its mass along; and its enormous bulk cuts through the ocean with amazing force and celerity. The fins are principally used for turning in the water, and giving a direction to the velocity impressed by the tail.

The whale produces its young at the end of nine or ten months, and is fatter at that time than usual, particularly when she is near her time of bringing forth. When she suckles her young, she throws herself on one side on the surface of the sea, and the young ones attach themselves to the teat. She has two breasts, which are white in some, and speckled in others, and are filled with milk, resembling that of land-animals.

The tenderness of the female for her offspring is very remarkable: wherever she goes, she carries it with her, and when closely pursued, keeps it supported between her fins. Even when wounded, she still clasps her progeny. If she plunges to avoid danger, she takes it to the bottom with her, but rises more frequently than usual, in order to give it breath.

They are generally seen in shoals of different kinds together, and migrate from one ocean to another in very large

companies. It appears astonishing how a number of these enormous animals find subsistence together; and still more extraordinary that they are usually fatter than any other animals of whatsoever element.

The whale is an inoffensive animal, and consequently has many enemies, which take advantage of his disposition, and his inability to combat: a small animal of the shell-fish kind, called the whale-louse, sticks to his body, like shells that are seen at the foul bottom of a ship. It usually takes its station under the fins, and, spite of the efforts of the whale, it continues its hold, and lives upon the fat; nature having furnished it with instruments adapted to the purpose.

The sword-fish is also a terrible enemy to the whale: the latter has no instrument of defence except the tail, with which it endeavours to strike the foe. And indeed a single blow taking place would effectually kill it: but the sword-fish is extremely active, and easily avoids the stroke; then bounding into the air, it falls upon its adversary, not with intent to pierce with its pointed beak, but to cut with its toothed edges. “The

“ sea,”

"sea," says Anderson, "all about is dyed with blood, proceeding from the wounds of the whale; while the enormous animal vainly endeavours to reach its invader, and strikes with its tail against the surface of the water, making a report at each blow louder than the noise of a cannon."

A cetaceous animal, called, by the fishermen of New England, the killer, is a still more powerful enemy. A number of these surround the whale; some attack it with their teeth before, and others behind, till the great animal is subdued; and, when it becomes their prey, it is said that they only devour its tongue.

But, the greatest of all the enemies of the whale, is man: he destroys more of those enormous fishes in a year than the rest do in an age. The great resort of these animals was on the inhospitable shores of Spitzbergen; where the distance of the voyage, the severity of the climate, the dangers of the icy sea, together with their own formidable bulk, might have been expected to protect them from human injury: all these however were but slight barriers against the arts, the courage, and the necessities of man.

The flesh of the whale is considered as a dainty in some nations, and the French seamen sometimes dress and use it as their ordinary diet: the English and Dutch sailors say it is hard and ill-tasted, but the French assert the contrary. The savages of Greenland, and those near the south pole, are exceedingly fond of it. They not only eat the flesh, but drink the oil, which they esteem one of their greatest delicacies. When they are so fortunate as to find a dead whale, they make their abode near it, and seldom remove while any flesh remains upon the bones.

In the court-yard of St. James's, is placed one of the bones of the lower jaw of a whale. We think it not impertinent to mention this, as it may tend to rectify a mistake of the numerous spectators who daily view it, and who in general suppose it to be a rib. They may, however, be easily distinguished; for the jaw-bone is of an irregular bend, and the rib is circular: and in circumference the jaw-bone measures four times as much as the rib.

THE PIKE-HEADED WHALE.

THE head is of an oblong form, sloping down, and gradually growing narrower to the nose; about six feet eight inches from the end of which, are two spout-holes, separated by a thin division. The eyes are small, the pectoral fins about five feet long, and eighteen inches broad. It has a large horny protuberance on the back, about eight feet and an half from the tail; and the tail is about nine feet and an half broad. The belly is uneven, and formed into folds lengthways: the skin, which is remarkably bright and smooth, is black on the back, and white on the belly.

This species has its name from the shape of its nose, which is narrower and sharper pointed than that of other whales.

This description was made from a whale taken on the coast of Scotland, which was forty-six feet in length, and its greatest circumference twenty feet.

THE ROUND-LIPPED WHALE.

THE lower lip of this species is broader than the upper, and of a semi-circular

32 *The round-lipped WHALE.*

circular form. One of them was taken near Abercon-castle, which was seventy-eight feet in length, and thirty-five in circumference. The gape was very wide; the tongue fifteen feet and an half long; the mouth was furnished with short whalebone about three feet in length; and two spout-holes, of a pyramidical form, were on the forehead. The eyes were thirteen feet from the end of the nose: the length of the pectoral fins was ten feet; and the height of the back fin three feet. The back fin was placed near the tail, which was eighteen feet in breadth. The belly was full of folds.

There are no less than seven different kinds of the whale, properly so called, viz.

The great Greenland whale, which is black on the back, and has no back-fin.

The Iceland whale, which is whitish on the back and has no back-fin.

The New England whale, which has a hump on the back.

The whale with six humps on the back.

The fin-fish, which is distinguished by a fin on the back, placed very low, and near the tail. Its length is equal to that of the common kind, but it is much
more

more slender. The blubber on the body of this kind is very inconsiderable, which, added to its extreme fierceness and agility, render the taking of it very dangerous, and cause it to be neglected by the fishermen; who are greatly disappointed on seeing it, for, on its appearance, the others retire out of those seas.

THE CACHALOT, OR SPERMACETI
W H A L E.

A WHALE of this species was brought into Greenland dock, by a trading vessel, in January, 1762. Those who were concerned in taking it, give the following account of this fish, and the manner in which it was killed.

Going through the Hope, they saw something floating at a distance, which had the appearance of the mast of a ship; but, as they approached it, they perceived it to be a large fish, and, upon seeing it cast up a great quantity of water, concluded it was a whale. They chased him ashore below the Hope-Point, and then went off to him in their boats. He seemed a motionless lump, his head and tail being concealed in the water. At first they pierced the prominent parts; and,

and, after having dug a hole about twelve inches deep, a great torrent of blood issued forth. Then they withdrew to some distance, and soon after the boat had passed him, (as the water was deep enough over his tail) he struck the ground with such violence, as to force up stones and mud to a considerable height in the air. They waited about three quarters of an hour, and then he expired with the most horrible groans. After this, they fastened a cable to his body, and at length brought him to Greenland-Dock, where he was daily visited by several thousands of people. Indeed the curiosity of the people drew them to Greenland-Dock, after the whale stunk so extremely, as to be offensive at an hundred yards distance.

They took out of his head eight puncheons of spermaceti, which lay between the eyes and the spout-hole, in different cells of the brain. Its length was fifty-four feet, and its breadth fourteen; and the length of the lower jaw was ten feet; the tail measured fifteen feet,

The skeleton of a whale of this kind was lately shewn at Mr. Rackstrow's exhibition-room, in Fleet street. Those who shewed this curiosity said it would contain thirty people in its head, and
fifty

fifty in its chest; and that twelve hogshheads of spermaceti oil had been taken out of its upper jaw, or rather that part of the head above it, which was entirely composed of flesh and oil.

This whale was thrown ashore on the Isle of Thanet, February 2, 1762*, and measured, from the snout to the tail-fin, seventy-two feet. The upper jaw, which appeared to be one solid bone, was sixteen feet long, and six broad at the top, where it was widest, and from whence it grew narrower to the end of the snout, which terminated in a point. Along the middle of it run a deep round groove, thro' which he sucked up the water, which he afterwards discharged at the spout-hole. From the top of this jaw proceeded a large thick bone, which turned upwards almost perpendicularly to the height of about four feet, and formed part of a kind of skull. The under jaw was much narrower than the upper, which is just the reverse of the toothless whale. At the distance of about eight feet from the

* This date was mentioned by the person who renewed Mr. Rackstrow's curiosities; but, if we may judge from the appearance of the skeleton, the animal must have been thrown ashore many years previous to the time here mentioned.

snout,

snout, it divides and becomes forked, in order to receive in the cavity a protuberance of the upper jaw, which seems exactly to fit it. This jaw had two rows of teeth, of which only one tooth then remained ; but this being quite loose, and kept in its place only by a piece of wire, it seems doubtful whether it be the real tooth or not. The upper jaw has no teeth ; but, instead of it, there is a groove or socket to receive those of the lower ; so that, when the mouth was shut, they must have resembled so many pointed weapons in a sheath.

The sockets of the eyes, which were almost round, and placed nearly at the furthest part of the jaws, measured about eighteen inches over. Hence, what is told us by some writers, that the crystalline humour of the eye in this fish is not larger than a pea, must appear to common reason as a fable ; for it cannot be conceived, that nature is so unequal in her proportions. Beyond the sockets of the eyes are the two fin bones, which are very thick, five feet long, and two feet three inches in the broadest part.

There were eleven ribs on each side, the largest of which was ten inches in circumference. They formed a cavity, eight

eight feet wide, within the body of the fish, and in which were contained the heart, lungs, &c. The back-bone was nearly the same distance from the floor, by which the ribs were supported. The back-bone, which is three feet ten inches thick, measured in the round part only ; (the upper part of it being closely set, throughout the whole length of it, with spinal bones, like those of a hog) and the tail-fins, composed the rest of this skeleton. The tail-fins were each eight feet long.

Though many parts of this skeleton seemed much decayed, owing perhaps in a great measure to the injuries it must have unavoidably received in being removed from place to place, it was nevertheless highly worthy the attention of those, who delight in natural curiosities.

The substance called *Spermaceti*, which is prepared from the brain of this whale, is an excellent balsamic, and a very valuable medicine in diseases of the breast ; as also to blunt the sharpness of the humours. It is very efficacious in old coughs, proceeding from defluxions, and in all internal ulcers. Indeed, various are the uses of this medicine, with respect to internal application : when ap-

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plied

38 *The grey-headed CACHALOT.*

plied externally, it is emollient and vulnerary, and is often used as a cosmetic, to soften the skin, and to render the complexion clear.

THE GREAT-HEADED CACHALOT.

THE head of this species is of an oblong form, and of such a bulk as to exceed that of all the rest of the body. The end of the upper jaw is about five feet longer than that of the lower : the spout hole is placed a little above the middle of the nose, and is divided in the middle, and covered with a lid. In the lower jaw there are forty-two teeth, bent like a sickle, thick in the middle, and growing smaller towards each end. The eyes are very small, not exceeding those of a haddock in magnitude ; on the middle of the back it has a long spine instead of a fin : the skin has a silky appearance, is thin, and of a black colour. The length of this species is usually about fifty-four feet ; and Linnæus informs us, that it pursues and terrifies the porpus so much, as frequently to drive them on shore.

THE

THE ROUND-HEADED CACHALOT.

ONE of this species was cast ashore on one of the Orkney isles, about twenty-four feet in length. The head of it was round, and the opening of the mouth small: the teeth were about an inch and three quarters long, and about the thickness of a man's thumb in the largest part. It had a rough place on the back, instead of a fin.

THE HIGH-FINNED CACHALOT.

THE spout-hole of this animal is placed in the front, and it has a fin on the middle of the back, which *Sibbald* compares to the mizen mast of a ship. The head abounds with the best sort of spermaceti. The teeth are slightly bent, about seven inches in length, and the greatest circumference nine. They are much compressed on the sides, and the points are rather blunt than flat: they are thin towards the bottom, having a very narrow but long orifice, or slit, hollowed to the depth of five inches and a quarter; and the teeth are immersed in the jaw as far as that hollow.

OF THE DOLPHIN, THE GRAMPUS, AND THE PORPUS.

THESE fish have all teeth both in the upper and the lower jaw, and are much smaller than the whale. The grampus, which is the largest, seldom exceeds twenty feet, which may be distinguished by the flatness of its head, resembling, in some degree, a boat turned upside down. The porpus resembles the grampus in many things, but the snout is not above eight feet long ; its snout also has more the appearance of that of an hog. The dolphin greatly resembles the porpus, except that its snout is longer and more pointed. They have all fins on the back ; they have all very large heads, like the rest of the whale-kind ; and resemble each other in their appetites, their manners, and conformations ; being equally voracious, active, and roving.

Their great agility prevents their being often taken. They seldom remain a moment above water ; sometimes, indeed, their too eager pursuits expose them to danger ; and a shoal of herrings often allures them out of their depth. Then indeed the hungry animal continues to flounder

flounder in the shallows till knocked on the head, or till the retiring tide seasonably comes to its relief. But all this tribe, and the dolphin in particular, are equally swift and destructive. No fish could escape them, but from the awkward position of the mouth, which is placed in a manner under the head: yet, even with these disadvantages, their depredations are so great, that they have long had the appellation of the plunderers of the deep.

The predilection of the ancients in favour of these animals, particularly the dolphin, is not easily accounted for. Historians and philosophers seem to have contended who should invent the greatest number of fables concerning them. The dolphin was celebrated in the earliest time for its fondness to the human race, and was distinguished by the epithets of the boy-loving and philanthropist. Scarce an accident could happen at sea, but the dolphin offered himself to convey the unfortunate to shore. The musician flung into the sea by pirates, the boy taking an airing into the midst of the sea, and returning again in safety, were obliged to the dolphin for its services. It is indeed difficult to assign a cause why the

ancients should thus have invented so many fables in their favour. Their figure is far from prejudicing us in their interests; their extreme rapacity tends still less to endear them: I know nothing that can reconcile them to man and excite his prejudices, except that when taken they sometimes have a plaintive moan, with which they continue to express their pain till they expire. This, at first, might have excited human pity; and that might have produced affection. At present they are regarded even by the vulgar in a very different light; their appearance is far from being esteemed a favourable omen by the seamen; and from their boundings, springs, and frolics in the water, experience has taught the mariners to prepare for a storm.

Neither is it to one circumstance only that the ancients have confined their fabulous reports concerning these animals; as from their leaps out of their element, they assume a temporary curvature, which is not their natural figure in the water; the old painters and sculptors have universally drawn them wrong. A dolphin is scarce ever exhibited by the ancients in a straight shape, but curved, in the position which they sometimes appear

pear in when exerting their force ; and the poets too have adopted the general error. Even Pliny has asserted, that they instantly die when taken out of the water ; but Rondelet, on the contrary, assures us, that he has seen a dolphin carried alive from Montpelier to Lyons.

The moderns have juster notions of these animals ; and disregard the many fables, which every day's experience contradicts. Indeed their numbers are so great, and, though shy, they are so often taken, that such peculiarities, if they were possessed of any, would have been long since ascertained. They are found, the porpus especially, in such vast numbers, in all parts of the sea that surrounds this kingdom, that they are sometimes noxious to seamen, when they sail in small vessels. In some places they almost darken the water as they rise to take breath, and particularly before bad weather, are much agitated, swimming against the wind, and tumbling about with unusual violence.

Whether these motions of the dolphin are the gambols of pleasure, or the agitations of terror, is not certainly known. Probably they dread those seasons of turbulence, when the lesser fishes shrink

shrink to the bottom, and their prey no longer present themselves in sufficient abundance. When the weather is fair, they are seen herding together, and pursuing shoals of various fish with great impetuosity. Their method of hunting their game, is to follow in a pack, and thus give each other mutual assistance. At that season when the mackarel, the herring, the salmon, and other fish of passage, begin to make their appearance, the cetaceous tribes are seen fierce in the pursuit; urging their prey from one creek or bay to another, deterring them from the shallows, driving them towards each other's ambush, and using a greater variety of arts than hounds are seen to exert in pursuing the hare. However, the porpus not only seeks for prey near the surface, but often descends to the bottom in search of sand-eels and sea-worms, which it roots out of the sand with its nose, as hogs harrow up the fields for food. For this purpose, the nose projects a little, is shorter and stronger than that of the dolphin; and the neck is furnished with very strong muscles, which enable it the readier to turn up the sand.

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Sometimes indeed it happens, that the impetuosity, or the hunger, of these animals, in their usual pursuits, urges them beyond the limits of safety. The fishermen, who extend their long nets for pilchards, on the coasts of Cornwall, have sometimes an unwelcome capture in one of these. Their feeble nets, which are calculated only for taking smaller prey, suffer an universal laceration, from the efforts of this strong animal to escape; and if it be not knocked on the head, before it has had time to flounder, the nets are destroyed, and the fishery interrupted. There is nothing, therefore, they so much dread, as the entangling a porpus; and they do every thing to intimidate the animal from approaching.

These animals are so violent in the pursuit of their prey, that they sometimes follow a shoal of small fishes up a fresh-water river, from whence they find it difficult to return. We have often seen them taken in the Thames at London, both above the bridges and below them. It is curious enough to observe with what activity they avoid their pursuers, and what little time they require to fetch breath above the water. The manner of killing them is for four or five boats

boats to spread over the part of the river in which they are seen, and with fire-arms to shoot at them the instant they rise above the water. The fish being thus for some time kept in agitation, requires to come to the surface at quicker intervals, and thus affords the marksmen more frequent opportunities.

The porpus yields a very large quantity of oil; and the lean of some, particularly if the animal be young, is said to be as well tasted as veal. The inhabitants of Norway prepare, from the eggs found in the body of this fish, a kind of caviare, which is said to be very delicate sauce, or good when even eaten with bread. There is a fishery for porpoises along the western isles of Scotland during the summer season, when they abound on that shore; and this branch of industry turns to good advantage.

We are told, that these animals go with young ten months; that, like the whale, they seldom bring forth above one at a time, and that in the midst of summer: that they live to a considerable age; and that they sleep with the snout above water. They seem to possess, in a degree proportioned to their bulk, the manners of whales; and the history of

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one species of cetaceous animals will, in a great measure, serve for all the rest.

The parts of the dolphin, appropriated to medicinal uses, are the liver, the ashes, the belly, and the fat. The belly dried, triturated, and exhibited in some proper liquor, is said to cure splenetic patients. It is said, that the liver roasted, and used with aliments, perfectly cures tertian and quartan fevers; as also, that species of nocturnal fever known by the name of typhus. The ashes are, by Pliny, enumerated among the medicines which cure the ringworm and leprosy. According to the same author, the fat melted, and drank with wine, cures dropical patients.

OF CARTILAGINOUS FISH.

ALL those fishes, whose muscles are supported by cartilages instead of bones, are called cartilaginous. Many of the cartilaginous fish are viviparous, being excluded from an egg which is hatched within them. The egg consists of a white and a yolk, and is lodged in a case, formed of a thick tough substance, resembling softened horn: such are the eggs of the ray and shark kinds. Some indeed

indeed differ in this respect, and are oviparous : such is the sturgeon and others.

Like the ray, some of them breathe through certain apertures beneath ; like the shark, others breathe through apertures on their sides ; or like the pike-fish, others breathe through an aperture on the top of the head, for they have not covers to their gills like the bony fish. Fishes of the cartilaginous kinds have their bones always soft and yielding ; and age, which hardens the bones of other animals, contributes still more to soften theirs. The size of all fishes encreases with their age ; but from the pliancy of the bones in this tribe, they seem to have no bounds placed to their dimensions : it is indeed supposed, that they grow larger every day that they exist. They usually choose colder seasons and situations than other fish for propagating their kind ; and many of them bring forth in the midst of winter.

THE LAMPREY.

LAMPREYS are sea-fish, but, like the salmon, they quit the salt waters about the latter end of the winter, or the beginning of spring ; and, after a stay
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of a few months, return again to the ocean, a very few excepted. Though the Severn is the most noted for them, they are found at certain seasons of the year not only in several of our rivers, but in the most considerable of the Scotch and Irish rivers. They are the most in season in the months of March, April, and May; for they are much firmer when just arrived out of the salt water, than they are afterwards; it having been observed, that they appear wasted and very flabby at the approach of hot weather.

It has been an ancient custom, for the city of Gloucester to present annually to his majesty a lamprey pye, covered with a large raised crust. As this present is made at Christmas, the corporation find it extremely difficult at that time to procure any fresh lampreys, it being so early in the season; and sometimes they have been known to purchase them at a guinea a-piece.

Lampreys are sometimes found that weigh four or five pounds: when either potted or stewed, they are reckoned a great delicacy; but they are a surfeiting food, as one of our monarchs fatally experienced; the death of Henry the First

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being occasioned by a plentiful meal of lampreys.

The mouth of this fish is round, and placed rather obliquely below the end of the nose: the edges are jagged, which enables them to adhere more strongly to the stones, as their custom is; and from which they are not to be drawn off without some difficulty. There are twenty rows of single teeth placed in the mouth of this animal, disposed in circular orders, and placed far within. The colour of the fish is dusky, marked with irregular spots of dirty yellow, which gives it a disagreeable appearance.

There is a species called the lesser lamprey, which grows to the length of about ten inches. The colour of the back is dusky, sometimes mixed with blue; and the whole under-side is silvery. They are found in the Thames, Severn, and Dee; and, when potted, are by some preferred to the larger kind. Great numbers are taken about Mortlake.

THE P R I D E.

THESE are frequent in the rivers near Oxford, particularly the Isis; but they are to be found in other English rivers; where,

where, instead of concealing themselves under the stones, they plunge into the mud, and never are seen to adhere to any thing like other lampreys. The body is marked with several transverse lines, passing the sides from the back to the bottom of the belly. The back fin is not angular, like that of the former, but of an equal breadth. The tail is sharp at the end.

THE SKATE.

IN proportion to its bulk, the skate is the thinnest of any of the genus, and also the largest, some weighing near an hundred pounds. The nose is short, and sharp pointed; it has a set of short spines above the eyes: the whole of the upper part is of a pale brown, and sometimes streaked with black: the lower part is white, marked with numerous minute black spots: the jaws are covered with small granulated, but sharp-pointed teeth. The tail, which is of a moderate length, has two fins near the end of it. One row of spines passes along the top of it, and a few others are irregularly dispersed on the edges. It is re-

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marked, that in the males of this species the fins are full of spines.

Skates generate in March and April, at which time they swim near the surface of the water, several of the males pursuing one female. The females cast the bags, in which the young are included, from May to September. They are exceedingly poor and thin in October, but they begin to improve in November, and grow gradually better till May, at which time they are in the highest perfection.

All fishes of this kind are ranker when first taken, than when they have been kept for two or three days.

THE SHARP-NOSED RAY.

THE nose of this fish is very long, narrow, and sharp-pointed, resembling the end of a spouton. The body is smooth and thin, in proportion to the size. The upper part is ash-coloured, spotted with numbers of white spots, and a few black ones: the lower part is entirely white: the tail is thick, with two small fins towards the end. The mouth is large, and furnished with numerous small sharp teeth, bending inwards. On

each

each side of the tail is a row of small spines, and another row runs up the middle.

Mr. Ray mentions the fondness of this ray for human flesh, and the method it takes of destroying men, by overlaying them, and keeping them down by its vast weight, till they are drowned. *Phile* gives nearly the same account of them; and we cannot refuse giving them credit, since Ulloa, in his voyages, vol. i. p. 132, gives exactly the same account of a fish found in the South Seas, which is the terror of those employed in the pearl fishery. It is said to surround, or wrap up, the unhappy divers till they are suffocated; to guard against which, the negroes never plunge into the water without a sharp knife to defend themselves against the assaults of this formidable enemy.

One of this species was taken in the strait that divides Anglesea from Carnarvonshire in 1768, which was near seven feet in length, and five feet two inches in breadth. It made a most remarkable snorting noise, when it was first brought on shore.

THE ROUGH R A Y.

THE rough ray derives its Latin name from the instruments used by fullers in smoothing cloth, the back being rough, with small spines resembling those instruments. These spines are spread over the head, and the upper part of the fins, as well as over the back: near the eye is a semi-circular order of large spines, and about the nose are a few others; a row of the same kind extends half way down the back; and the tail is armed with a double row of still greater spines. The upper part is a mixture of ash-colour and yellow, and the lower part of the body is entirely white.

The rough ray inflicts but slight wounds with the prickles with which almost its whole body is covered. It appears harmless to the ignorant, and any one would, at first sight, venture to take it in his hand, without any apprehensions; but the adventurer would soon find, that there is not a single part of its body that is not armed with spines; and that there is no method of seizing the animal, but by the little fin at the end of the tail.

THE

THE CRAMP RAY, OR TORPEDO.

THE torpedo is a well-known formidable animal : the narcotic, or numbing quality of this fish, has been taken notice of in all ages. The body of this fish is almost circular, and thicker than others of the ray kind. The skin is soft, smooth, and of a yellowish colour, marked with large annular spots like the rest of the kind ; the eyes are very small ; the tail tapering to a point ; and the weight of the fish from five to fifteen pounds. From its outward appearance, no person would suppose it to be furnished with any extraordinary powers ; it has no muscles that seem calculated for any great exertions ; no internal conformation essentially differing from the rest of its kind ; yet such is that unaccountable power it possesses, that, when alive, it instantly deprives the person who touches it of the use of his arm, and even affects him if he touches it with a stick. Oppia says it will benumb the astonished fisherman, even through the whole length of line and rod.

The hook'd torpedo ne'er forgets its art,
But soon as struck begins to play its part,
And

And to the line applies its magic sides;
 Without delay the subtle power glides
 Along the pliant rod, and slender hairs,
 Then to the fisher's hand as swift repairs:
 Amaz'd he stands; his arms of sense bereft,
 Down drops the idle rod; his prey is left:
 Not less benumb'd than if he'd felt the whole
 Of frost's severest rage beneath the arctic
 pole.

The shock given by the torpedo resembles the stroke of an electrical machine. Kempfer gives us the following account of it. "The instant," says he, "I touched it with my hand, I felt
 "a terrible numbness in my arm, and
 "as far up as my shoulder. Even if
 "one treads upon it with the shoe on,
 "it affects not only the leg, but the
 "whole thigh upwards. Those who
 "touch it with the foot, are seized with
 "a stronger palpitation than even those
 "who touch it with the hand. This
 "numbness bears no resemblance to that
 "which we feel when a nerve is a long
 "time pressed, and the foot is said to be
 "asleep; it rather appears like a sudden
 "vapour, which, passing through the
 "pores in an instant, penetrates to the
 "very springs of life, from whence it
 "diffuses itself over the whole body,
 and

“ and gives real pain. The nerves are
“ so affected, that the person struck im-
“ agines all the bones of his body, and
“ particularly those of the limb that re-
“ ceived the blow, are driven out of
“ joint. All this is accompanied with
“ an universal tremor, a sickness of the
“ stomach, a general convulsion, and a
“ total suspension of the faculties of the
“ mind. In short, such is the pain, that
“ all the force of our promises and au-
“ thority, could not prevail upon a sea-
“ man to undergo the shock a second
“ time. A negroe, indeed, that was
“ standing by, readily undertook to touch
“ the torpedo; and was seen to handle
“ it without feeling any of its effects.
“ He informed us, that his whole secret
“ consisted in keeping his breath; and
“ we found, upon trial, that this me-
“ thod answered with ourselves. When
“ we held in our breath, the torpedo
“ was harmless, but when we breathed
“ ever so little, its efficacy took place.”

Though Kempfer has given a good
description of the effects of this animal's
shock, yet succeeding experience has con-
vinced us, that holding the breath will
not preserve us from its violence; tho'
the fish may be sometimes touched with
perfect security.

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Great as the powers of this fish are when in vigour, they are impaired as it declines in strength, and totally cease when it expires. No noxious qualities are imputed to it as a food, for they are frequently eat by the French, who find them more frequently on their coasts, than we do on ours.

There is a double use in this strange power the torpedo is endued with: it is exerted as a means of defence against voracious fish, which are at a touch deprived of all possibility of seizing their prey; and by concealing itself in the mud, and benumbing the fish that are carelessly swimming about, it makes a ready prey of them.

The torpedo inhabits hot or warm climates, and is rarely taken in the British seas.

It is generally supposed, that the female torpedo is much more powerful than the male. Lorenzini, who has made several experiments upon this animal, is of opinion, that its power wholly resides in two thin muscles that cover a part of the back. These he calls the trembling fibres; and he seems convinced, that the animal may be touched with safety in any other part. It is now generally

generally known, that there are other fish of the ray kind, possessed of the numbing quality, which has acquired them the name of the torpedo. Atkins and Moore describe these as shaped like a mackarel, except that the head is considerably larger.

Condamine describes a fish possessed of the powers of the torpedo, of a shape very different from the former, and greatly resembling a lamprey. He also informs us, that if it is touched by the hands, or even with a stick, it instantly benumbs the hand and arm to the very shoulder.

Captain Johnson being at Cassan, a sailor caught one of these fish, which he supposed to be a bream; but the very instant that he touched it, he cried out that he had lost the use of his hand. His companions laughed at him, and one of them immediately trod upon it with his naked foot, when his whole leg became suddenly motionless: the cook was then called, and ordered to take the fish and dress it; but he immediately let it fall, and, in a mournful tone, declared he was seized with the palsy. At length a negro, who was present, said he was acquainted with the fish, and assured them that, after it was dead, it would lose the numbing quality.

The

The following experiment, made by Mr. Walsh, in presence of the academy at Rochelle, for evincing the circuit of the electric matter which issues from the torpedo, deserves to be quoted.

“ A living torpedo was laid on a table, upon a wet napkin ; round another table stood five persons insulated ; and two brass wires, each thirteen feet long were suspended from the ceiling by silken strings. One of the wires rested by one end on the wet napkin, the other end was immersed in a basin full of water, placed on a second table, on which stood four other basins, likewise full of water. The first person put a finger of one hand into the water in which the wire was immersed, and a finger of the other hand into the second, and so on successively till all the five persons communicated with one another by the water in the basins. In the last basin one end of the second wire was dipped, and with the other end Mr. Walsh touched the back of the torpedo ; when the five persons felt a shock, differing in nothing from that of the Leyden experiment, except being weaker. Mr. Walsh, who was not in the circle of conduction, felt nothing. This was several times successively repeated.

peated, even with eight persons ; and the experiment being related by M. de Signette, mayor of the city, and one of the secretaries to the academy of sciences of Rochelle, and published by him in the French Gazette, the account becomes the more authenticated."

The discourse ends with the following address to Mr. Walsh, on presenting him with the medal.

" In consequence of the approbation of the choice made by the council, so unfeignedly expressed in the countenance of every gentleman present, it remains, that in the name, and by the authority, of the Royal Society in London, formed for the improvement of natural knowledge, I deliver into your hand this medal, the prize you have so meritoriously obtained ; not doubting, Sir, of your grateful acceptance of so honourable and unperishing a memorial of their esteem, and of the sense of their obligations to a person, who in so distinguished a manner has contributed to promote the great ends of their institution. And, in the same respectable name, let me add, that they are so much persuaded of your abilities to assist in their grand work, the *interpretation of nature*, that they earnestly call
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upon you to continue your liberal and spirited labours. With pleasure they understand that you have already turned your views to the electric gymnotus, that other wonder of the waters, an animal possessed of powers similar to those of the torpedo, but of superior energy ; and the society flatter themselves, that so much light will be gained by that enquiry, that you will be enabled soon to make a farther discovery of the mysteries of nature. Her veil, fear not, Sir, to approach. Animated with the presence of this illustrious and successful body, I will venture to affirm, that nature has no veil, but what time and persevering experiments may remove. In the instance before us, view the progress of the powers of the mind ; view the philosophers of the early ages, like the “ children of the world”, amused and satisfied with the stories of the torpedo, as incurious about their authenticity, as about the causes of such extraordinary effects. This animal served them for an emblem, or an hieroglyphic, for a figure of speech, or an allusion of pleasantry ; at best as a theme for a copy of verses. But the world, rising in years and in wisdom, rejects such trifles. The interpreters of nature, in

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the adult state of time, make experiments and inductions, distrust their intellects, confide in facts and in their senses: and by these arts drawing aside the veil of nature, find a mean and groveling animal armed with lightning; that awful and celestial fire revered by the antients as the peculiar attribute of the father of their gods."

The following is a curious account of the *Gymnotus Electricus*, or electrical Eel. In a Letter from Alexander Garden, M. D. F. R. S. to John Ellis, Esq; F. R. S. read before the Royal Society the 23d of February, 1775.

Charles-Town, South-Carolina.

August 14, 1774.

S I R,

A few days since I went to see some very curious fish, which were brought here about nine or ten weeks ago from Surinam; and I was both surprized and delighted to observe their strange shape, and experience their wonderful properties. I had before received some vague account of such a fish; but I always thought, that much of what I always heard was fabulous. There are five of

these fishes now here, of different sizes, from two feet in length, to three feet eight inches. The following description was made out from the longest and largest. It might have been much more accurate, if there had been a possibility of handling the fish, and examining it leisurely; or if I could have had a dead specimen, as many things relating to the internal and external structure could in that case have been more exactly ascertained. But this fish hath the amazing power of giving so sudden and so violent a shock to any person that touches it, that there is, I think, an absolute impossibility of ever examining, accurately, a living specimen, and the person who owns them, rates them at too high a price (not less than fifty guineas for the smallest) for me to get a dead specimen, unless one should die by accident; if that should happen, you may depend on having a more exact and accurate account for the Society.

George Baker, mariner, who brought them here, intends to carry them to England; but as it is very uncertain whether they will arrive in health, and alive, I have recommended to him to get a small cask of rum, with a large bung

into which he may put any of them that may die, and so prepare them for the inspection and examination of the curious when he arrives.

The largest of these fish was three feet eight inches in length, when extending itself most, and might have been from ten to fourteen inches in circumference about the thickest part of the body. The head is large, broad, flat, smooth, and impressed here and there with holes, as if perforated with a blunt needle, especially towards the sides, where they are more regularly ranged in a line on each side. The rostrum is obtuse and rounded. The upper and lower jaws are of an equal length, and the gape is large. The nostrils are two on each side; the first large, tubular, and elevated above the surface; and the others small, and level with the skin, placed immediately behind the verge of the rostrum, at the distance of an inch asunder. The eyes are small, flattish, and of a blueish colour, placed about three quarters of an inch behind the nostrils, and towards the sides of the head. The whole head seems to be well supported; but whether with bones or cartilages, I could not learn. The body is large, thick, and roundish, for a consi-

derable distance from the head, and then gradually grows smaller, but at the same time deeper, or becomes of an acinaciform shape to the point of the tail, which is rather blunt. There are many light coloured spots on the back and sides of the belly, placed at considerable distances in irregular lines, but more numerous and distinct towards the tail. When the fish was swimming, it measured sixteen inches in depth near the middle, from the upper part of the back to the lower edge of the fin, and it could not be more than two inches broad on the back at that place. The whole body, from about four inches below the head, seems to be clearly distinguished into four different longitudinal parts or divisions. The upper part, or back, is roundish, of a dark colour, and separated from the other parts on each side by the lateral lines, which, taking their rise at the base of the head, just above the pectoral fins, run down the sides, gradually converging as the fish grows smaller, to the tail, and makes so visible a depression or furrow in their course, as to distinguish this from the second part or division, which may be properly called the body, or at least appears to be the strong muscular

part

part of the fish. This second division is of a lighter and more clear blueish colour than the upper or back part, and seems to swell out somewhat on each side, from the depression of the lateral lines; but towards the lower or under part, is again contracted, or sharpened into the third part, or carina. This carina, or keel, is very distinguishable from the other two divisions by its thinness, its apparent laxness, and by the reticulated skin of a more grey and light colour, with which it is covered. When the animal swims gently in pretty deep water, the rhomboidal reticulations of the skin of this carina are very discernible; but when the water is shallow, or the depth of the carina is contracted, these reticulations appear like many irregular longitudinal plicæ. The carina begins about six or seven inches below the base of the head, and gradually widening or deepening as it goes along, reaches down to the tail, where it is thinnest. It seems to be of a strong muscular nature. Where it first takes its rise from the body of the fish, it seems to be about one inch, or one inch and an half thick, and is gradually sharpened to a thin edge, where the fourth and last part is situated, *viz.*
a long,

a long, deep, soft, wavy fin, which takes its rise about three or four inches at most below the head, and runs down along the sharp edge of the carina, to the extremity of the tail. Where it first rises it is not deep, but gradually deepens or widens as it approaches the tail. It is of a very pliable, soft consistence, and seems rather longer than the body. The situation of the anus in this fish is very singular, being placed underneath, and being about an inch more forward than the pectoral fins, and consequently considerably nearer the rostrum. It is a pretty long rima in appearance; but the aperture must be very small, as the formed excrements are only about the size of a quill of a common dung-hill fowl. There are two pectoral (if I may call them so) fins, placed one on each side, just behind the head, over the *foramina spiratoria*, which are small, and generally covered with a lax skin, situated in the axillæ of these fins. These fins are small for the size of the fish, being scarcely an inch in length, of a very thin, delicate consistence, and orbicular shape. They seem to be chiefly useful in supporting and raising the head of the fish when he wants to breathe, which he

does

does every four or five minutes, by raising his mouth out of the water: this shews that he has lungs, and is amphibious, and *foramina spiratoria* seem to indicate his having *bronchiæ* likewise; but this I only offer as a conjecture, not being certain of the fact. I must now mention the appearance of a number of small cross bands, annular divisions, or rather *rugæ* of the skin of the body. They reach across the body down to the base of the carina on each side; but those that cross the back seem to terminate at the lateral lines, where new rings take their rise, not exactly in the same line, and run down the carina. This gives the fish somewhat of a worm-like appearance; and indeed it seems to have some of the properties of this tribe, for it has a power of lengthening or shortening its body to a certain degree, for its own conveniency, or agreeable to its own inclination. I have seen this specimen, which I have measured three feet eight inches, shorten himself to three feet two inches; but besides this power of lengthening or shortening his body, he can swim forwards or backwards with apparently equal ease to himself; which is another property of the vermicular tribe.

tribe. When he swims forwards, the undulation, or wavy motion of the fin and carina, begin from the upper part, and move downwards; but when he swims backwards, and the tail goes foremost, and the undulations of the fin begin at the extremity of the tail or fin, and proceed in succession from that backwards to the upper part of the body; in either case he swims equally swift. Every now and then the fish lays himself on one side, as it were, to rest himself, and then the four several divisions of his body above-mentioned are very distinctly seen, viz. the vermiform appearance of the two upper divisions; the retiform appearance of the carina; and the last, or dark-coloured fin, whose rays seem to be exceedingly soft and flexible, and entirely at the command of the strong muscular carina. When he is taken out of the water, and laid on his belly, the carina and fin lie to one side, in the same manner as the ventral fin of the tetraodon does, when he creeps on the ground. I have been the longer and more particular in the description of the external structure of this animal's body, because I think, as it is of a most singular nature, and endowed with some amazing

pro-

properties, even the most minute circumstance I was able to observe relating to it, should be mentioned.

The person to whom these animals belong, calls them *electrical fish*; and indeed the power they have of giving an electrical shock to any person, or to any number of persons who join hands together, the extreme person on each side touching the fish, is their most singular and astonishing property. All the five we have here are possessed of this power in a very great degree, and communicate the shock to one person, or to any number of persons, either by the immediate touch of the fish with the hand, or by the mediation of any metalline rod. The keeper says, that when they were first caught, they could give a much stronger shock by a metalline conductor than they can do at present. The person who is to receive the shock, must take the fish with both hands, at some considerable distance asunder, so as to form the communication, otherwise he will not receive it; at least I never saw any one shocked from taking hold of it with one hand only; though some have assured me, that they were shocked by laying one hand on him. I myself have
taken

taken hold of the largest with one hand only, without ever receiving a shock; but I never touched it with both hands, at a little distance asunder, without feeling a smart shock. I have often remarked, that when it is taken hold of with one hand, and the other hand is put into the water over its body, without touching it, the person received a smart shock; and I have observed the same effect follow when a number joined hands, and the person at one extremity of the circle took hold of, or touched the fish, and the person at the other extremity put his hand into the water, over the body of the fish. The shock was communicated through the whole circle as smartly as if both the extreme persons had touched the fish. In this it seems to differ widely from the torpedo, or else we are much misinformed of the manner in which the benumbing effect of that fish is communicated. The shock which our Surinam fish gives, seems to be wholly electrical; and all the phænomena or properties of it exactly resemble those of the electric aura of our atmosphere when collected, as far as they are discoverable from the several trials made on this fish. This

stroke

stroke is communicated by the same conductors, and intercepted by the interposition of the same original electrics, or electrics *per se*, as they used to be called. The keeper of these fish informs me, that he caught them in Surinam river, a great way up, beyond where the salt water reaches; and they are a fresh-water fish only. He says that they are eaten, and by some people esteemed a great delicacy. They live on fish, worms, or any animal food, if it is cut small, so that they can swallow it. When small-lived fishes are thrown into the water, they first give them a shock, which kills, or stupifies them, that they may swallow them easily, and without any trouble. If one of these small fishes after it is shocked, and to all appearance dead, be taken out of the vessel where the electrical fish is, and put into fresh water, it will soon revive again. If a larger fish than they can swallow be thrown into the water at a time that they are hungry, they give him some smart shocks, till he is apparently dead, and then try to swallow or suck him in; but after several attempts, finding he is too large, they quit him. Upon the most careful inspection of such fish, I

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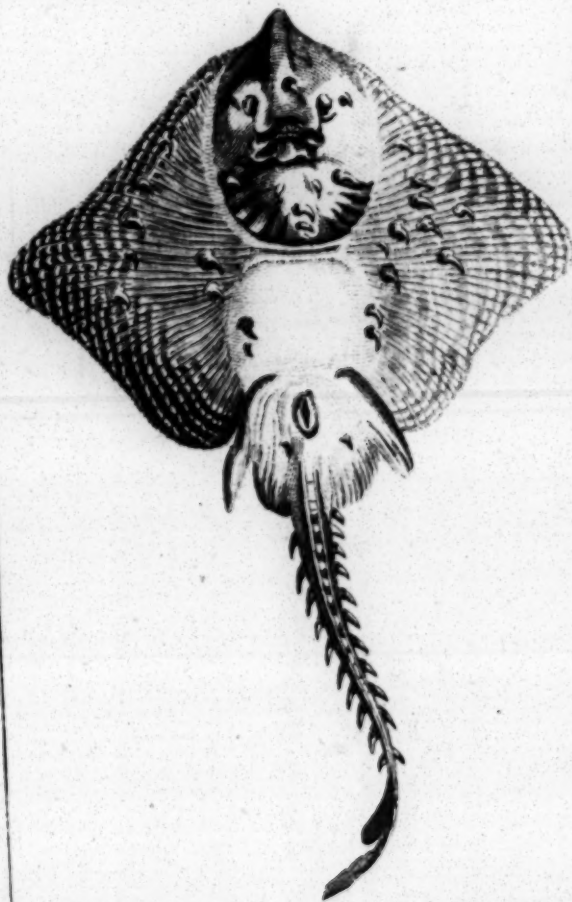
could never see any mark of teeth, or the least wound or scratch on them. When the electrical fish are hungry, they are pretty keen after their food; but they are soon satisfied, not being able to contain much at a time. An electrical fish of three feet and upwards in length, cannot swallow a small fish above two or at most three inches and a half long. Since I wrote the above description and remarks, I have had Mr. Bancroft's Essay on the Natural History of Guiana put into my hands, in which I find an account of this animal; but as I think he has not been very particular in the description of it, I resolved still to send you the above account, that you might judge for yourself. I observe, that his account, or description, and mine differ in several things, and amongst others, where he says, that those fish were usually about three feet in length; but the one, of which I have sent a slight description, was three feet eight inches. This small variation might indeed have happened without any error; but I am told, that some of them have been seen in Surinam river upwards of twenty feet long, whose stroke or shock proved



Thornback





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proved instant death to any person that unluckily received it.

THE THORNBACk.

THE thornback differs from the skate, in being less, and in being armed with a greater number of spines or prickles, from whence it has its name. It has one row on the back, and three on the tail. Mr. Pennant mentions a large one that he had seen, which had three rows on the back, and five on the tail. The shape of the body, exclusive of the tail, is nearly square, and yet a transverse line, drawn from corner to corner, is longer than a line drawn from the head to the root of the tail, so that the fish may in reality be said to be broader than it is long. It has no scales, but is covered with a kind of slime, which renders it extremely slippery. The upper part is of a dusky colour, spotted with white, and the belly is entirely white; the eyes are very prominent, and placed on the upper part of the head, having no bone or any thing else to defend them. On the nose, and on the inner side of the forehead, near the eyes, are a few prickles; and others are irregu-

larly scattered on the upper part of the pectoral fins.

If a thornback is placed with the belly uppermost, the nostrils appear, and are contiguous to the mouth, which is destitute of teeth; but the jaw-bones are as rough as a file. The gills, as in other fish of this kind, consist of five holes, placed in a semicircular form; and there are two semicircles on the lower part of the fish, one encompassing the breast, and the other the lower belly, which is divided from the upper by a bone, where these circles touch.

The young fish have very few prickles on them, and their backs are often spotted with white, each spot being encircled with black. Thornbacks are sometimes found to weigh fourteen or fifteen pounds, but with us they seldom exceed eight.

They frequent our sandy shores, and are very voracious; they feed on all sorts of flat fish, and are particularly fond of herrings and sand eels. Sometimes they feed upon crustaceous animals, such as crabs, &c. They begin to generate in June, and produce their young in July and August, which (as well as those of the skate) are called

Maiden

Maids before they are old enough to breed. In November the thornback begins to be in season, and continues so later than the skate, but the young of both are good at any time of the year.

The flesh of the thornback resembles that of a skate, but it is less delicate, and harder of digestion; but the liver is considered by some as a great delicacy.

THE STING RAY, OR FIRE FLARE.

THIS is distinguished from other cartilaginous fish, in having a remarkable spine on the tail, which is a formidable weapon. The tail is very thick at the beginning; the spine is placed about a third the length of the former from the body, and is about six inches long, flat on the top and bottom, very hard, and sharp-pointed, the two sides of which are thin, and sharply bearded the whole way. The tail, which extends about four inches beyond the end of this spine, gradually becomes slender at the extremity.

The spine, with which nature has armed this fish, has occasioned the ancients to give many tremendous fables concerning it. Pliny, Ælian, and Op-
pian,

pian, have given it a venom that affects even the inanimate creation *. But there is not the least credit to be given to the account of its venomous qualities ; though it is still believed by fishermen in several parts of the kingdom. Considered, indeed, as a weapon of defence, it is capable of giving a dangerous wound, when it falls on a tendinous part, or on a person in a bad habit of body. As to any fish having a spine charged with actual poison, we must beg leave to refuse our assent to it, tho' the opinion is sanctified by the name of Linnæus.

This species shed their spine, and renew them annually ; and the new spine sometimes appears before the old one drops off, on which account the Cornish people call it the Cardinal Trilost, or three tailed.

The sting-ray does not grow to the bulk of the others ; the eyes are large, and placed in the upper part of the head, and the mouth in the lower. It has a hole behind each eye ; the mouth is large, and placed transversely, and the nose is long and sharp-pointed. The apertures on the gills are five on each

* Hist. an. lib. II. c. 36.

side, beginning a little below the mouth, and extending to the breast. The sides are terminated, throughout their whole length, by a broad fin.

The body is quite smooth, and almost of a circular shape; it is thicker in the middle than any other ray, but grows very thin towards the edges. The upper part of the body is of a dirty yellow colour, the middle part of a dullish blue; the lower side white, and the tail and spine dusky.

THE ANGEL FISH.

THIS is also called the monk-fish, and is of a middle nature between rays and sharks, partaking something of the character of both, though it is an exception to each in the situation of the mouth, which is placed at the extremity of the head; it grows to a very large size, and sometimes weighs upwards of one hundred and fifty pounds. The back and sides are of a dirty ash-colour, and very rough; and the belly is white. The head is roundish at the extremity, and in each jaw there are three rows of teeth, each row consisting of eighteen; but the number is not exactly the same
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in all fish of this kind; Mr. Pennant mentions one that had five rows of teeth all round the jaws. Like those of all sharks, the animal can raise or depress them at pleasure, by means of muscles uniting them to the jaws, not being lodged in sockets as the teeth of cetaceous fish are. The tongue is broad, and sharp at the end; and the nostrils, which are placed on the upper lip, are wide, and filled with a kind of slime; the eyes are smallish, and behind each is a semilunar orifice. Instead of gills, it has five holes like the thornback. It has two fins, placed near the head, which resemble wings, and is therefore called the angel-fish; angels being represented with wings; the ventral fins are placed in the same manner.

This fish is frequently found on our coasts, where it prowls about for prey, like others of the kind. It is extremely voracious, and, like the ray, feeds on flat-fish and flounders, which keep near the bottom of the water. It is extremely fierce, and dangerous to be approached. Mr. Pennant acquaints us of an instance of a fisherman, whose leg was terribly torn by a large one of this species, which lay within his nets in shal-

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low water, and which he went to lay hold of incautiously*.

These, as well as the rest of the genus, have much malignity in their aspect: their eyes, which are oblong, sunk into their head, and over-hung by their skin, seem fuller of malevolence than fire.

Their skin, which is very rough, was used by the antients to polish wood and ivory, for which purposes the moderns use that of the greater dog-fish. The flesh was formerly thought a delicacy, but is now neglected even by the poorest people, on account of its coarseness and rankness.

THE PICKED DOG FISH.

THIS fish has its name from a strong sharp spine, placed before each of the back fins, which distinguishes it from the rest of the British sharks. It has a roundish oblong body, which is covered with a rough skin: the back is of a brownish ash-colour, and the belly is white, and smoother than the other parts: the eyes are oblong, and covered with a double membrane. The mouth is placed just under the eyes, and is armed with a

* Pennant's British Zoology, vol. iii. p. 75.

double row of small teeth, which bend from the middle of each jaw towards the corners of the mouth. The nose is long, and extends greatly beyond the mouth, but is blunt at the end. It has no fin on the lower part of the body, between the vent and the tail, by which it may be distinguished from all other fish of this kind. It grows to the weight of about twenty pounds, and is frequently taken in the British ocean and the Irish sea.

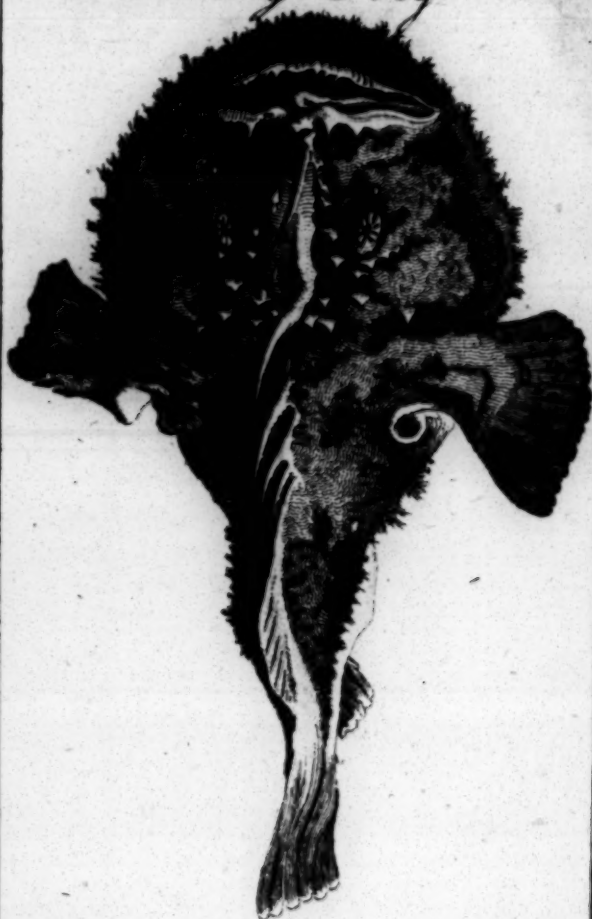
THE SMOOTH DOG FISH.

THIS fish is destitute of teeth, but to supply the defect, the bones of each jaw are as rough as a file. The skin, as its name implies, is smooth, but that of all others of this kind is rough: by this difference, it may be readily distinguished from the picked dog fish.

THE FISHING FROG, OR FROG FISH.

THE frog-fish resembles a tadpole or young frog in shape, but it appears a tadpole of enormous size, for it sometimes exceeds five feet in length, and has a mouth above a yard wide. Its deformity

Fishing Frog





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mity is not to be exceeded : the head is considerably larger than the whole body ; the under jaw projects beyond the upper, and both are armed with sharp slender teeth : there are also teeth in the palate, and at the root of the tongue, which is large and broad ; the eyes are placed at the top of the head, and are encompassed with prickles : immediately above the nose are two long strings or filaments, which resemble a fishing-line, and it is said the animal converts them to the purposes of fishing. The back is flat, and greyish, with somewhat of a reddish and greenish cast : it has three bristles or strings on the middle of the back, which seem to supply the place of a fin ; and several strings, resembling fins, hang round the body : two fins are placed under the throat, which resemble the feet of a mole ; by the assistance of which they creep at the bottom of the sea.

The flesh of the frog-fish is white, when boiled, and tastes like that of a frog. The fishermen have, in general, a great regard for this ugly fish, as it is an enemy to the dog fish ; the bodies of those voracious animals being frequently found in its stomach ; and, whenever they

they take it, they make a point of giving it its liberty.

THE WHITE SHARK.

OF all the inhabitants of the deep, those of the shark kind are the fiercest and the most voracious; but the great white shark, which is the largest of the kind, joins, to the most amazing rapidity, the strongest appetites for mischief. In size, he approaches nearly to the whale, and far surpasses him in celerity and strength, in the formidable arrangement of his teeth, and his insatiable desire of plunder. Gillius informs us, that the great white shark will grow to the weight of four thousand pounds, and that in the body of one of them a human body was found entire.

The head is large and flattish; the eyes are also large, and the snout is long. The mouth is enormously wide, placed far beneath, and therefore these, as well as the rest of the shark kind, are said to be obliged to turn on their backs to seize their prey; which is an observation as antient as the days of Pliny. The throat is extremely wide, and capable of swallowing a man with the greatest ease.

But

But its furniture of teeth is still more terrible: of these there are six rows, which are flat, triangular, exceedingly sharp at their edges, and finely serrated. It is said there are seventy-two in each jaw, but many are of opinion, that their number is uncertain; and that these terrible instruments of destruction encrease in proportion as the animal grows older. When the fish is in a state of repose, this dreadful apparatus lie flat in the mouth; but, when it seizes its prey, it has a power of erecting them, by the assistance of a set of muscles that join them to the jaw.

The other parts of this fish are almost equally terrible to behold. Its pectoral fins are very large; it is furnished with large goggle eyes, which it turns with pleasure on every side, and can behold its prey behind it as well as before: its whole aspect is marked with a character of malignity. The tail is of a semi-lunar form, but the upper part is longer than the lower. It has vast strength in the tail, and can strike with amazing force; on which account the sailors cut it off with an ax as soon as they have got it on board. The colour of the whole body and fins of this animal is a
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light grey ; its skin is rough, hard, and prickly ; and is that substance that covers instrument cases, called shagreen.

The shark is as dreadful from his courage and activity, as from his formidable appearance : no fish can swim faster, none are so constantly employed in swimming ; he outstrips the swiftest ships, plays round them, and seems to gaze at the passengers, without exhibiting the smallest symptom of an effort to proceed.

The depredations this animal commits are frequent and formidable : in all hot climates he is the dread of the sailors, where he constantly attends the ships in expectation of what may fall overboard. Dr. Goldsmith relates, that, as a sailor was bathing in the Mediterranean, near Antibes, in the year 1744, while he was swimming about fifty yards from the ship, perceived a monstrous fish approaching him ; struck with terror at his approach, the poor man cried out to his companions in the vessel to take him on board ; immediately they threw him a rope, and were drawing him up the ship's side, when the shark darted after him and bit off one of his legs. Indeed, when a man has the misfortune to be pursued by any of these animals, he p

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fishes without redemption ; they having been perceived to dart at them like guinea-worms at a worm. " A master of a " Guinea ship," says Mr. Pennant, " informed me, that a rage of suicide " prevailed among his new-bought slaves, " from a notion the unhappy creatures " had, that after death they should be " restored again to their families, friends, " and country. To convince them at " least that they should not re-animate " their bodies, he ordered one of their " corpses to be tied by the heels to a rope, " and lowered into the sea ; and, tho' " it was drawn up again as fast as the " united force of the crew could be ex- " erted, yet in that short space the sharks " had devoured every part but the feet, " which were secured at the end of the " cord."

So great is the rapacity of the shark, that nothing which has life is rejected by it : but human flesh appears to be its most favourite food ; when once it has fed upon mankind, it continually haunts those places where it expects a return of its prey : it is however asserted, that this voracious fish will take the black man's flesh in preference to the white, and that when men of different colours are in the

water together, it always makes choice of the former.

The usual method of taking a shark, is to bait a hook with a piece of beef or pork, which the sailors throw into the sea affixed to a strong cord, strengthened near the hook with an iron chain; as without such precaution the shark would presently bite the cord in two, and set himself at liberty. He approaches it, swims round it, and examines it, and appears for a time to neglect it; but when the sailors make a pretence, by drawing the rope, as if intending to take the bait away, then his hunger excites him, he darts at the bait, and swallows it, hook and all. When he finds the hook lodged in his maw, he exercises his utmost efforts to continue in his natural element; but, when his strength is exhausted, he suffers his head to be drawn above water, the sailors confine his tail by a noose, draw him on ship-board, and dispatch him as soon as possible, by beating him on the head; yet even this is attended with difficulty and danger; the enormous creature, terrible even in the agonies of death, still struggles with his destroyers, and is the most difficult to be killed of any animal in the world.

Belonius

Belonius assures us, that he saw a female shark produce eleven live young ones at a time, and that the female in this tribe is larger than the male.

The antients were acquainted with this fish: Oppian, in particular, gives a long and very entertaining account of its capture. Their flesh, which is sometimes eaten, is exceedingly coarse and rank, and hardly digestible by any but the negroes, who are remarkably fond of it: the liver affords three or four quarts of oil; and the skin, as we have already observed, is polished into that substance, known among us by the name of shark-green.

THE BLUE SHARK.

THE back of this animal is of a lively blue colour, and the belly of a silver white: it is of an oblong form, and from six to eight feet in length: the skin is smoother than that of other sharks: the snout is long, sharp, flat, and indented with many small holes above and below: the mouth is large, and placed like that of the white shark, but it is not furnished with so many teeth.

Ælian says this species will permit the small brood, when in danger, to swim down its mouth, and take shelter in its belly. This fact is confirmed by Rondeletius; and, as Mr. Pennant observes, it is no more incredible, than that the young of the opossum should seek an asylum in the ventral pouch of its parent; a fact too well known to be contested. It is probable, that this degree of affection is not peculiar to the blue shark, but common to the whole genus.

The blue shark frequents many of our coasts, particularly those of Cornwall during the pilchard season. Though Rondeletius says he was an eye-witness to its fondness for human flesh, yet it is less destructive in our seas, owing perhaps to the coolness of the climate, which is known to abate the fierceness of some animals, and the venom of others.

THE SEA FOX, OR SEA APE.

THIS animal is called the sea fox on account of the length of its tail, and the rank smell of its flesh, which is not unlike that of the fox. It is sometimes found so large as to weigh upwards of an hundred pounds, and has a round short body,

Sea Fox





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body, and a small mouth a little below the snout, which is sharp, and armed with teeth. The belly of this fish is white, and the back of an ash-colour. This fish is principally remarkable for the great length of its tail, which resembles a sword, is as long as the whole body, and has a fin at the root of it. It is usually met with in the Mediterranean sea, and is sometimes taken in our seas. Some imagine it to be the fish called the threshers, from its attacking and overcoming the grampus with its long tail, whenever that species of whale rises to the surface to breathe.

THE T O P E.

THE fins, and the upper part of the body of this fish, is ash-coloured; the belly is white: the nose is very long, flat, and sharp-pointed, and the nostrils are placed very near the mouth: the eyes have small pupils in proportion to the bulk of the body, and behind each eye is a small orifice. The teeth, which are very numerous, are small, sharp, triangular, and serrated on their inner edge: they are disposed in three rows. Its skin and flesh has a rank and offensive smell.

Mr.

Mr. Pennant mentions one that was taken on our coast in the year 1768, which weighed twenty-seven pounds, and was five feet in length; but they grow to a much larger size, and sometimes exceed an hundred pounds in weight. This is very fierce and voracious, and will even pursue its enemy to the edge of the shore.

THE SAW FISH.

THIS animal has its name from a saw, which the bones of its nose is supposed to resemble; but they bear a greater similitude to the teeth of a comb, placed at some distance from each other: they are placed on each side of the bone, and are from twenty to thirty in number, and some of them are near five feet in length, when the body of the fish is about ten feet. The back of this fish is of an ash-colour, and the belly white: it has no teeth in its mouth, which is transversely cleft, but the lips are as rough as a file. The saw-fish has no fins on the back, and four on the belly, two on each side, those next the head being the broadest and the longest. The eyes stand high out of the head, and the mouth is directly

directly underneath the eyes: the nostrils are oblong. These animals are great enemies to the whale and fin-fish; many of them assembling round one, which they never quit till they have destroyed. They feed only on his tongue, and leave the rest behind. The saw-fish inhabits different parts of the ocean, but in the north seas they are found in the greatest plenty; perhaps because great numbers of whales inhabit those seas.

THE STURGEON.

THE sturgeon grows to the length of eighteen feet, and to the weight of five hundred pounds, but it is seldom taken in our rivers of that bulk. The nose is very long, slender, and ends in a point; on the lower part of the nose are four beards: the mouth, which is situated far beneath, is small, and unsupported by any jaw-bones; neither is it furnished with any teeth. The eyes are extremely small, and the nostrils are placed near them. The whole under-side of the fish, from the end of the nose to the vent, is entirely flat; and on the back is a single fin, not very remote from the tail. It has also two pectoral fins, two ventrals, and

and one anal fin. The upper part of the body is of a dirty olive colour; the lower part silvery, and the middle of the tubercles white. It is an exception among the cartilaginous fish in the manner of breeding, being like the bony fish oviparous, spawning in winter.

In its general form it resembles a freshwater pike. Though it is harmless and ill provided for war, the body is formidable enough to appearance. It is long, pentagonal, and covered with five rows of large bony knobs, one row on the back, and two on each side, and a number of fins to give it greater expedition. Of this fish there are three kinds; the common sturgeon, the caviare sturgeon, and the huso, or isinglass fish. The first has eleven knobs or scales on the back; the second has fifteen; and the latter thirteen on the back, and forty-three on the tail. These differences seem slight to us who only consider the animal's form; but those who consider its uses find the distinction of considerable importance. The first is the sturgeon, the flesh of which is sent pickled into all parts of Europe. The second is the fish from the roe of which that celebrated delicacy called caviare is made; and the

third,

third, besides supplying the caviare, furnishes also the valuable commodity of isinglass. They all grow to a very large size.

This fish visits every country in Europe at different seasons; it annually ascends the largest rivers to spawn, and propagates in an amazing number. The inhabitants along the banks of the Po, the Danube, and the Walga, make great profit annually of its incursions up the stream, and have their nets prepared for its reception. The sturgeon also is brought daily to the markets of Rome and Venice, and they are known to abound in the Mediterranean sea. Yet those that keep entirely either in salt or fresh water are but comparatively small. When the sturgeon enjoys the vicissitude of fresh and salt water, it is then that it grows to an enormous size, so as almost to rival even the whale in magnitude.

England receives frequent visits from this much esteemed fish. It is often accidentally taken in our rivers in salmon nets, particularly in those parts that are not far remote from the sea. The largest we have heard of caught in Great Britain, was a fish taken in the Eske, where they are most frequently found, which weighed

weighed four hundred and sixty pounds. An enormous size to those who have only seen our fresh-water fishes.

North America also furnishes the sturgeon; their rivers in May, June, and July, supply them in very great abundance. At that time they are seen sporting in the water, and leaping from its surface several yards into the air. When they fall again on their sides, the noise is heard in still weather at some miles distance.

But the greatest numbers are to be found in the lakes of Frischehaff and Curischaff, near the city of Pillau. The adjacent shores are formed into districts, and farmed out to companies of fishermen, some of which are rented for six thousand gilders per annum. In the rivers also that empty themselves into the Euxine Sea, this fish is caught in great numbers, particularly at the mouth of the river Don. In all these places the fishermen regularly expect their arrival from the sea, and have their nets and salt ready prepared for their reception.

As the sturgeon is not a voracious fish, it is never caught by a bait in the ordinary manner of fishing, but always in nets. From the description given above

of its mouth, it is not to be supposed that the sturgeon would swallow any hook capable of holding so large a bulk and so strong a swimmer. Indeed it never attempts to seize any of the finny tribe, but lives by rooting at the bottom of the sea, where it makes insects and sea-plants its whole subsistence. From this quality of floundering at the bottom it has received its name; which comes from the German verb *floeren*, signifying to wallow in the mud. It is obvious to all those who cut it open, that it does not subsist upon large animals, for nothing is found in its stomach but a kind of slimy substance; whence some imagine it lives only upon air and water. Hence arose a German proverb, applied to a man extremely temperate, when they say he is as moderate as a sturgeon.

The sturgeon is as timid in its nature as temperate in its appetites. There would be scarce any method of taking it, did not its natural desire of propagation induce it to incur so great a variety of dangers. The smallest fish is alone sufficient to terrify a shoal of sturgeons; for, being unfurnished with any weapon of defence, they trust entirely to their swiftness, and their caution for security.

I

Like

Like all animals that do not make war upon others, sturgeons live in society among themselves; rather for the purposes of pleasure, than from any power of mutual protection. Gesner asserts, that they are delighted with sounds of various kinds; and that he has seen them shoal together, at the notes of a trumpet.

The usual time for the sturgeon to come up rivers to deposit its spawn, is about the beginning of summer, when the fishermen of all great rivers make a regular preparation for its reception. The nets in which the sturgeon are caught, are made of small cord, and placed across the mouth of the river; but in such a manner that, whether the tide ebbs or flows, the pouch of the net goes with the stream. The sturgeon thus caught, while in the water, is one of the strongest fishes that swim, and often breaks the net to pieces that encloses it; but the instant it is raised with its head above water, all its activity ceases: it is then a lifeless, spiritless lump, and suffers itself to be tamely dragged on shore. It has been thought prudent, however, to draw it to shore gently; for, if excited by any unnecessary violence, it has been found to break the fishermen's legs with a blow.

a blow of its tail. The most experienced fishers, therefore, when they have drawn it to the brink, keep the head always elevated, which prevents its doing any mischief with the hinder part of the body : others, by a noose, fasten the head and tail together ; and thus, without immediately dispatching it, bring it to the market, if there be one near ; or keep it till their number is compleated for exportation.

The flesh of the sturgeon pickled, is very well known at all the tables of Europe ; and is even more prized in England, than in any of the countries where it is usually caught. The fishermen have two different methods of preparing it. The one is by cutting it in long pieces lengthwise, and having salted them, hang them up in the sun to dry : the fish thus prepared is sold in all the countries of the Levant, and supplies the want of better provision. The other method, which is usually practised in Holland, and along the shores of the Baltic, is to cut the sturgeon crosswise into short pieces, and put it into small barrels, with a pickle made of salt and saumure. This is the sturgeon which is sold in England ; and of which great quantities

came from the north, until we gave encouragement to the importation of it from North America. From thence we are very well supplied; but it is said, the fish are inferior to those imported from the north of Europe.

A considerable trade is also carried on with the roe of the sturgeon, which is salted and preserved in a particular manner, and called Caviare: it is made from the roe of all kinds of sturgeon, but particularly the second. This is much more in request in other countries of Europe than with us. To all these high relished meats, the appetite must be formed by degrees: and tho' formerly even in England it was frequently served at the politest tables, it is at present sunk entirely into disuse. It is still, however, a considerable merchandize among the Turks, Greeks, and Venetians. Caviare somewhat resembles soft soap in consistence; but it is of a brown, uniform colour, and is eaten as cheese with bread. The manner of making it is this: they take the spawn from the body of the sturgeon, and freeing it from the small membranes that connect it together, they wash it with vinegar, and afterwards spread it to dry upon a table; they then put it

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into a vessel with salt, breaking the spawn with their hands, and not with a pestle; this done, they put it into a canvas bag, letting the liquor drain from it; lastly, they put it in a tub, with holes in the bottom, so that, if there be any moisture still remaining, it may run out: then it is prest down, and covered up close for use.

But the Huso or Isinglass fish is caught in great quantities in the Danube, from October to January: it is seldom under fifty pounds weight, and often exceeds four hundred: its flesh is soft, glutinous and flabby; but it is sometimes salted, which improves the taste of it, and then it turns red like salmon. It is for the commodity it furnishes, that it is chiefly taken. Isinglass is of a whitish substance, inclining to yellow; done up into rolls, and so exported for use. It is serviceable not only in medicine, but many arts. The varnisher, the wine-merchant, and even the clothier, are acquainted with its uses; and very large sums are yearly expended upon this single article of commerce. They make it thus: they cut the skin, the entrails, the fins, and the tail of this fish, into small pieces; these are left to macerate in a sufficient quantity of warm water, and they are all boiled shortly after with

a slow fire, until they are dissolved and reduced to a jelly; this jelly is spread upon instruments made for the purpose, so, that drying, it assumes the form of parchment, and, when quite dry, it is then rolled into the form which we see it in the shops.

This valuable commodity is principally furnished from Russia, where they prepare great quantities surprisngly cheap. The antients were acquainted with the fish that afforded this drug. Pliny mentions it * under the name of Ichthyocolla, and says, that the glue which was produced from it had the same title; and afterwards adds, that it was made out of the belly of the fish.

Sturgeon, says Lemery †, was much esteemed by the ancient Romans, and the belly is reckoned best. It contains much oil and volatile salt, and yields a nourishing and solid food, because of its thick and gross juices. It is, also, hard, toughish, fat, and difficult of digestion; and therefore it is injurious to weak and tender persons, and those who are sick or recovering from illnesses. As sturgeon is fat, it relaxes the fibres of the stomach and bowels, and renders the body a little

* Lib. xxxii. c. 7. † Lemery on Foods.
soluble.

soluble. The bones of this fish, taken to the quantity of a dram, are looked upon to be opening, good for rheumatisms and the gravel; they extract what is called mouth or water-glue from it, which is not so soon dissolved as the common sort, but produces the same effects.

THE SUN-FISH.

IT has a broad short body, covered behind with a circular fin, which answers the purpose of a tail, so that it has the appearance of a bulky head, and the body seems to have been cut off in the middle. Its ordinary length is about ten feet, though it is sometimes found to weigh upwards of an hundred pounds. It has a large rough thick skin, but no scales: the back is blackish, and the belly of a silver white; but both the belly and back terminate in a sharp ridge. In proportion to the size of the fish, the mouth is very small, and when opened is roundish. The jaws, which are hard and rough, are armed with several rows of sharp teeth. The eyes are small, and before each is a semicircular aperture; the pectoral fins are very small, and placed behind them. The dorsal and the anal

anal fins are high, and placed at the extremity of the body: the tail fin is narrower.

Here seems to be no satisfactory reason for calling this animal the sun-fish; perhaps from the roundness of its body, or from its shining in the night. It is found in the Mediterranean sea, in the ocean, and on the coasts of Cornwall. A fish of this kind was taken near Plymouth in 1734, which weighed five hundred pounds.

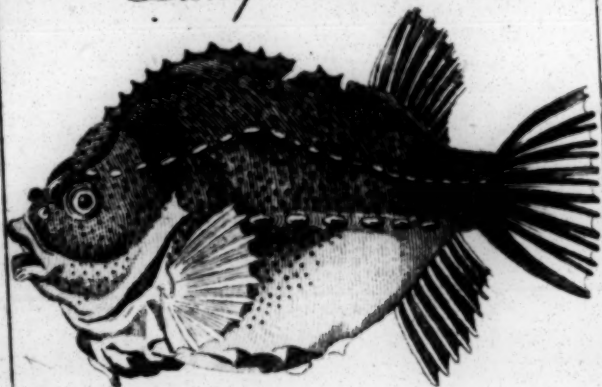
When boiled it becomes a glutinous jelly, resembling boiled starch when cold; and serves the purposes of glue.

THE SHORT SUN FISH.

This is much shorter and deeper than the other: the back and the anal fins are higher, and the aperture on the gills is not semi-circular, but oval. The situation of the fins are the same in both. Though both these kinds are taken on the western coasts of this kingdom, they are much more numerous in the warmer parts of Europe.



Lump Fish



Sea Snail



THE LUMP FISH.

THIS is also called the sea-owl, and in Scotland the cock-paddle. This singular fish encreases to the weight of four pounds, and the length of sixteen inches : the shape of the body is like that of the bream, deep, but very thick, and it swims edgeways. It is of a blackish colour, a little tinged with red : it has no scales, but the skin is rough, with sharp tubercles of a blackish colour in every part. There are three rows of crooked spines or prickles on each side ; and another row of the same on the top of the back. The belly is of a bright crimson colour ; the pectoral fins are large and broad, almost uniting at their base. Beneath this is the part by which it adheres to rocks, &c. under the water, and this so firmly, that it is very difficult to remove it. It consists of an oval aperture, surrounded with a muscular and soft substance, edged with small appendages like threads, which concur as so many clasps. By the assistance of this part, it adheres firmly to whatever it pleases : on putting a fish of this species, just caught, into a pail of water, it fixes
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itself with such force to the bottom, that, on taking the fish by the tail, the whole pail may be lifted up, though it holds some gallons, and that without removing the fish from its hold. However extraordinary this may appear, we have sufficient testimony of the truth of it, for Mr. Pennant informs us he has *known** an instance of the kind.

The mouth of the lump-fish resembles that of the sun-fish, but is somewhat larger : the lips are flat and thick ; the jaws are full of teeth, and the nostrils are tubes or pipes which rise above the skin.

These fish are found in great abundance in the Greenland seas, during the months of April and May, when they approach the shore to spawn. They have extremely large roes, which the Greenlanders boil and eat : they are remarkably fat, which renders them more agreeable to the natives, who are fond of oily food.

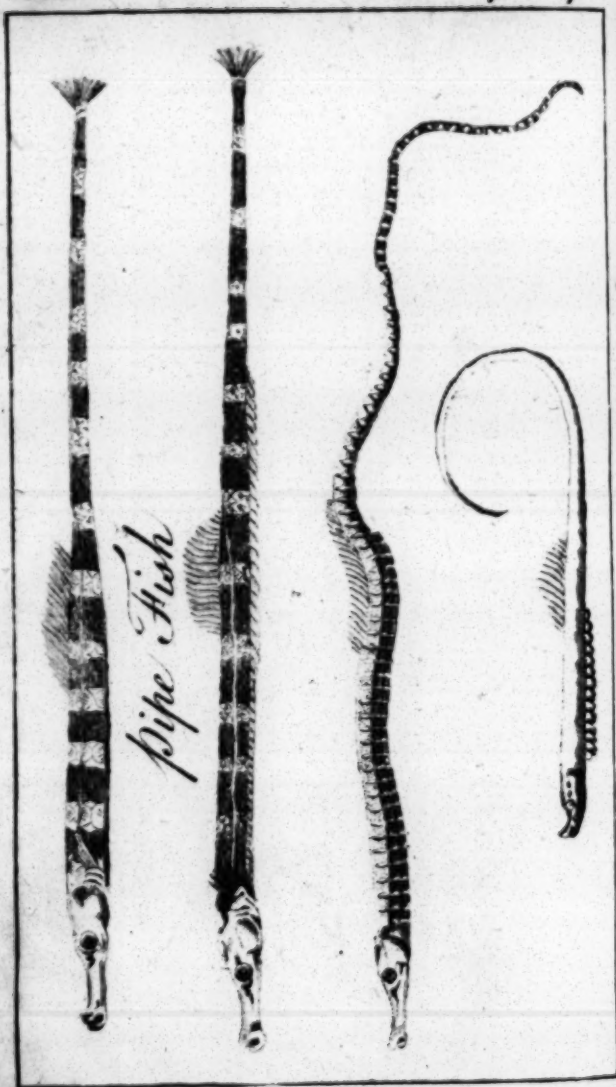
THE SEA SNAIL.

THIS animal takes its name from the soft and unctuous texture of its body,

* Pennant's Brit. Zoology, vol. iii. p. 104.

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resembling the snail upon land ; it is almost transparent, and quickly dissolves and melts away. It is but a small fish, not exceeding five inches in length. When fresh taken, the colour is of a pale brown : the shape of the body is round, and the back fin extends from the head to the tail. Beneath the throat is a round depression, of a whitish colour, surrounded by twelve broken spots, placed in a circle. The head is large, thick, and round ; the jaws are very rough, but are destitute of teeth : the belly is white and very protuberant. It adheres to the rocks, &c. like the other species. It is found in the sea, near the mouths of great rivers.

THE PIKE FISH.

THE body of this fish, in the thickest part, is not thicker than a swan's quill, when the animal is about sixteen inches long. This is angular, but as the angles are not very sharp, they are hardly discernible till the fish is dried. The general colour of this fish is an olive brown, marked with several blueish lines, pointing from the back to the belly ; which, in dried fish, appear like
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the signs of so many joints. They are viviparous, for on crushing one immediately after it was taken, hundreds of minute young ones were perceived to crawl out.

There is another of this tribe called the shorter pike fish, which is shorter and thicker than the former, and is not longer than twelve inches.

The little pike fish, as its name implies, is very small, not exceeding five inches in length. It is very slender, and tapers off to a point.

OF SPINOUS FISHES.

THESE are obviously distinguished from the rest by having a complete bony covering to their gills; by their being furnished with no other method of breathing than with gills only; by their bones, which are sharp and thorny; and their tails, which are placed in a situation perpendicular to the body. This is that class which alone our later naturalists are willing to admit as fishes. The cetaceous class with them are but beasts that have taken up their abode in the ocean; the cartilaginous class are an amphibious band, that are but half denizens of that

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element: according to the moderns, it is fishes of the spinous kind that really deserve the appellation.

The generality of mankind will hardly allow this distinction; but whatever be the justice of this preference in favour of the spinous class, it is certain that the cetaceous and cartilaginous classes bear no proportion to them in number. Of the spinous classes, above four hundred species are already known; the numbers of the former are therefore trifling in comparison, and not above a fifth part of the finny creation.

From the infinite variety in this class, it is obvious how difficult a task it must have been to describe or remember even a part of what it contains. When six hundred different sorts of animals offer themselves to consideration, the mind is bewildered in the multiplicity of objects that all lay some claim to its attention. To obviate this confusion, systems have been devised, which, throwing several fishes that agree in many particulars into one groupe, and thus uniting all into so many particular bodies, the mind that was incapable of separately considering each, is enabled to comprehend all when

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thus offered in larger masses to its consideration.

Of all the beings in animated nature, fishes seem most to demand a systematical arrangement. Quadrupedes are but few, and can be all known; birds, from their seldom varying in their size, can be very tolerably distinguished without system; but among fishes, which no size can discriminate, where the animal of ten inches and that of ten feet is entirely the same, there must be some other criterion by which they are to be distinguished; something that gives precision to our ideas of the animal whose history we desire to know.

Very little is yet known of the real history of fishes; but of a great many we have full and sufficient accounts, as to their external form. It would be unpardonable, therefore, in an history of these animals, not to give the little we do know; and, at least, arrange our forces, though we cannot tell their destination. In this art of arrangement, Artedi and Linnæus have long been conspicuous: they have both taken a view of the animal's form in different lights; and, from the parts which most struck

them

Of spinous FISHES. III

them, have founded their respective systems.

Artedi, who was the foremost of the two, perceiving that some fishes had hard prickly fins, as the pike; that others had soft pliant ones, as the herring; and that others still were destitute of that particular fin, by which the gills are opened and shut, as the eel, made out a system from these varieties. Linnæus, on the other hand, rejecting this system, which he found liable to too many exceptions, considered the fins, not with regard to their substance, but their position. The ventral fins seems to be the great object of his system; he considers them in fishes supplying the same offices as feet in quadrupedes; and from their total absence, or from their being situated nearer the head or the tail, in different fishes, he takes the differences of his system.

These arrangements, which are in a great degree arbitrary, and which are rather a method than a science, are always fluctuating; and the last is generally preferred to the preceding. There has lately appeared, however, a system composed by Mr. Gouan of Montpellier, that deserves approbation for more than

its novelty. It appears the best arrangement of this kind that ever was made; in which the divisions are not only precisely systematical, but in some measure adopted by nature itself. This learned Frenchman has united the systems of Artedi and Linnæus together; and by bringing one to correct the other, has made out a number of tribes, that are marked with the utmost precision. A part of this system, however, we have already gone through in the cartilaginous. In the arrangement of these I have followed Linnæus, as the number of them was but small, and his method simple. But in that which is more properly called the spinous class of fishes, I shall principally follow Mr. Gouan's system; the terms of which, as well as of all the former systems, require some explanation. I do not love to multiply the technical terms of a science; but it often happens, that names, by being long used, are as necessary to be known as the science itself.

If we pay due attention to the substance of the fin of a fish, we shall find it composed, besides the skin, either of straight, hard, pointed, bony prickles or spines, as in the pike; or of soft, crook-

ed or forked bones, or cartilages, as in the herring. The fish that have bony prickly fins, are called prickly finned fish; the latter, that have soft or cartilaginous fins, are called soft finned fish. The prickly finned fish have received the Greek new-formed name of *acanthopterygii*; the soft finned fish have likewise their barbarous Greek name of *malacopterygii*. Thus far Artedi has supplied Mr. Gouan with names and divisions. All spinous fish are divided into prickly finned fish, and soft finned fish.

Linnaeus, indeed, has taught him to remark the situation of the fins: for the ventral or belly fins, which are those particularly to be remarked, are either wholly wanting, as in the eel, and then the fish is called *apodal* (a Greek word signifying without feet;) or the ventral fins are placed more forward than the pectoral fins, as in the haddock, and then the animal is called a *jugular* fish; or the ventral fins are placed directly under the pectoral fins, as in the father-lasher, and then it is called a *thoracic* fish: or, lastly, the ventral fins are placed nearer the tail than the pectoral fins, as in the minnow, and then it is an *abdominal* fish.

The French naturalist then mixes and unites these distributions into two grand divisions. All the prickly finned fish make one general division; all the soft finned fish another. These first are distinguished from each other, as being either *apodal*, *jugular*, *thoracic* or *abdominal*. Thus there are prickly finned *apodal* fishes; prickly finned *jugular* fishes, prickly finned *thoracic* fishes, and prickly finned *abdominal* fishes. On the other hand, the soft finned fishes fall under a similar distribution, and make the other general division. Thus there are soft finned *apodal* fishes, soft finned *jugular* fishes, soft finned *thoracic* fishes, and soft finned *abdominal* fishes. These general characters are strongly marked, and easily remembered. It only remains, therefore, to divide these into such tribes as are most strongly marked by nature; and to give the distinct characters of each, to form a complete system with great simplicity. This Mr. Gouan has done; and the reader, who can contain in his memory the characteristic marks of these, will have a tolerable idea of the form of every kind of spinous fish: but as to the history and nature of the animal,

mal itself, that can only be obtained by information and experience.

Having mentioned a method by which spinous fishes may be distinguished from each other, the history of each in particular will naturally follow: the history of any one of this class, indeed, very much resembles that of all the rest: they breathe air and water through the gills; they live by rapine; each devouring such animals as its mouth is capable of admitting; and they propagate, not by bringing forth their young alive, as in the cetaceous tribes, nor by distinct eggs, as in the generality of the cartilaginous tribes, but by spawn, or peas, as they are generally called, which they produce by hundreds of thousands. These are the leading marks that run through their whole history, and which have so much swelled books with tiresome repetition.

We shall carefully draw this numerous class into one point of view, and mark how they differ from the former classes; and what they possess peculiarly striking, so as to distinguish them from each other: the first object that presents itself, and that by which they differ from all others, are the bones. These, when examined but slightly, appear to be entirely

tirely solid; yet, when viewed more closely, every bone will be found hollow, and filled with a substance less rancid and oily than marrow. These bones are very numerous, and pointed; and, as in quadrupedes, are the props or stays to which the muscles are fixed, which move the different parts of the body.

In all spinous fishes of the same kind, the number of bones is always the same. It is a vulgar observation, that fishes are at some seasons more bony than at others; indeed this scarce requires contradiction. It is however true, that fish are at some seasons much fatter than at others; so that the quantity of the flesh being diminished, and that of the bones remaining the same, they appear to increase in number, as they actually bear a greater proportion.

It has been already observed, that all fish of the same kind, have the same number of bones: the skeleton of a fish, however irregularly the bones may fall in our way at table, has its members very regularly disposed; and every bone has its fixed place, with as much precision as we find in the orders of a regular fabric. But then, spinous fish differ in the number of bones according to the species

cies; for some have a greater number of fins, by which they move in the water. The number in each is always in proportion to the number and size of these fins: for every fish has a regular apparatus of bones and muscles, by which the fins are moved; and all those fish where they are numerous or large, must consequently be considerably bony. Indeed in the larger fish, the quantity of flesh is so much, and the bones themselves are so large, that they are easily seen and separated: but in the smaller kinds with many fins, the bones are as numerous as in the great; yet being so very minute, they lurk almost in every part of the flesh, and are dangerous as well as troublesome to be eaten. In a word, those fish which are large, fat, and have few fins, are found to be the least bony; those which are small, lean, and have many fins, are the most bony of all others. Thus, for instance, a roach appears more bony than a carp, because it is leaner and smaller; and it is actually more bony than an eel, because it has a greater number of fins.

The spinous fish, as they partake less of the quadrupede in their formation than any others, so they can bear to live

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out of their own element a shorter time. In general, when taken out of the water, they testify their change by panting more violently and at closer intervals; the thin air not furnishing their gills the proper play; and in a few minutes they expire. Some indeed are more vivacious in air than others; the eel will live several hours out of water; and the carp has been known to be fattened in a damp cellar.

The method is by placing it in a net well wrapped up in wet moss, the mouth only out, and then hung up in a vault. The fish is fed with white bread and milk; and the net sometimes plunged into the water. The animal, thus managed, has been known not only to live for a fortnight, but to grow exceedingly fat, and of a superior flavour: from this it appears, that the want of moisture in the gills, is the chief cause of the death of these animals; and could that be supplied, their lives might be prolonged in the air, almost as well as in their own element.

It is, however, impossible to account for the different operations of the same element, upon animals that, to appearance, have the same conformation. To
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some fishes, bred in the sea, fresh water is immediate destruction: on the other hand, some fishes, that live in our lakes and ponds, cannot endure the salt water. Whence this difference can arise, is not easily accounted for. The saline quality of the water cannot properly be given as the cause; since no fishes imbibe any of the sea's saltness with their food, or in respiration. The flesh of all fishes is equally fresh, both in the river, and at the saltest depths of the ocean; the salt of the element in which they live, not in the least mixing with their constitution. Whence then is it, that animals will live only there, and will quickly expire, when carried into fresh water? It may probably arise from the superior weight of the sea water. As from the great quantity of salt dissolved in its composition, it is much heavier than fresh water, so it is probable it lies with greater force upon the organs of the respiration, and gives them their proper and necessary play: on the other hand, those fish which are used only to fresh water, cannot bear the weight of the saline fluid, and expire in a manner suffocated in the grossness of the strange element.

Thus

Thus it is evident, that there are some tribes that live only in the sea, and others only in fresh water, yet there are some whose organs are equally adapted to either element; and that spend a part of the time allotted them by nature in one, and a part in the other. Thus the salmon, the shad, the smelt, and the flounder, annually quit their native ocean, and visit our rivers to deposit their spawn. This seems the most important business of their lives; and there is no danger which they will not encounter, even to the surmounting precipices, to find a proper place for the deposition of their future offspring. The salmon, upon these occasions, is known to ascend rivers five hundred miles from the sea; and to brave not only the danger of various enemies, but also to spring up cataracts as high as a house. As soon as they come to the bottom of the torrent, they seem disappointed to meet the obstruction, and swim some paces back: they then take a view of the danger that lies before them, survey it motionless for some minutes, advance, and again retreat; till at last, summoning up all their force, they take a leap from the bottom, their body straight, and strongly in motion;

tion ; and thus most frequently clear every obstruction. Sometimes indeed it happens, that they have not sufficient strength to make the leap ; and then, in our fisheries, they are taken in their descent. But this is one of the smallest dangers that attend these adventuring animals in their progress : numberless are the methods of taking them ; as well by the hook, as by nets, baskets, and other inventions. Their capture makes, in several countries, a great article of commerce ; as being cured in several different manners, either by salting, pickling, or drying, they are sent to all the markets of Europe. They are indeed either fresh, dried, or pickled, very excellent food, and immense quantities of them are annually consumed.

THE E E L.

THIS is a very singular fish in many things that relate to its natural history, and in some respects borders on the nature of the reptile tribe. During the night it will quit its element to wander along the meadows ; not only for the change of habitation, but also for the

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fake of prey, feeding on the snails which it discovers in its passage.

In winter it sinks deep into the mud, and continues in a state of rest like the serpent kind. Morton, in his history of Northamptonshire*, informs us, that in the river Nyne there is a species of small eel, with a smaller head and a larger mouth than the common kind, which is called the *bed-eel*, and is found in clusters at the bottom of the river.

The antients adopted extravagant notions about the generation of these fish; supposing they were either created from the mud, or that the scrapings of their bodies, which they left on the stones, were animated and became young eels. Some moderns have given into these, and other equally wild opinions. The appearance of eels, in ponds that were never stocked with them, they knew not how to account for; especially when they were so remote, as to make their being met with in such places a phenomenon. It is however extremely probable, that many waters are supplied with these fish by the aquatic fowl or prey; in the same manner as vegetation is spread by many of the land birds, by

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dropping seeds as they carry them to feed their young ; and such may be the occasion of the appearance of eels in places where they were never seen before. With respect to the immediate generation of these fish, it has been sufficiently proved to be effected in the usual course of nature, and that they are viviparous. They will live out of water longer than any fish, and are extremely tenacious of life, as their parts will move a considerable time after they are cut in pieces.

The eel is extremely voracious, and very destructive to the fry of fish.

The eyes of the eel are placed at a small distance from the end of the nose : the iris of the eye is tinged with red ; the teeth are small, sharp, and numerous : the under jaw is longer than the upper : beneath each eye is a minute orifice ; and at the end of the nose two others, which are small and tubular. The eel has a pair of pectoral fins, rounded at their ends ; it has also a narrow fin on the back, uniting with that of the tail ; and the anal fin joins in the same manner beneath. The orifice to the gills is behind the pectoral fin.

Eels differ in their colours, from a sooty hue to a light olive green : those

which are called silver eels, have white bellies, and a remarkable clearness throughout.

There is a variety of this fish, known in the Thames by the name of grigs, and about Oxford by that of grigs or gluts. They have a larger head, a blunter nose, and a thicker skin than the common sort; neither are they so fat, or so much esteemed; nor do they often exceed three pounds in weight.

Common eels sometimes grow so large as to weigh upwards of twenty pounds, but that is extremely rare. The eel is the most universal of fish, and yet it is hardly ever found in the Danube, tho' it is very common in the lakes and rivers of Upper Austria. Tho' the Romans held these fish very cheap, the luxurious Syberites were so fond of them, as to exempt the persons who sold them from every kind of tribute.

Those which are found in rivers, or other clear running waters, are the best; as to their size it is immaterial: the liver and the gall are extremely acrid. Boerhaave says, that no fishes have a more acrid gall; and that with a mixture of the galls of the eel and the pike, made into pills, he hath cured many ricketty children.

dren with hard and swelled bellies. The torporific eel, found in Guiana, in South America, if caught by a hook, violently shocks the person who holds the line : the same eel touched with an iron rod, held in the hand of a person whose other hand is joined to another, &c. communicates a violent shock to ten or twelve persons thus joining hands, in a manner exactly similar to that of the electric machine. No shock is perceived by the holding the hand in the water near the fish when it is neither displeased nor touched ; but if it is angry, it can give a shock to a person at five or six inches distance. This shock is produced by an emission of electric particles, which the fish discharges at pleasure. On the death of the animal no such electric property remains, and then the Indians eat it.

The eel is a fresh-water fish ; sometimes it is found in the sea ; not that it is produced there, but because it goes often out of rivers into the sea, and so back again into rivers ; it delights in pure and running waters ; and they assure us it grows lean, poor, and dies at last, when confined to muddy water. It requires also a great deal of water, for otherwise it dies. It is said it cannot

bear any considerable difference of living; for in case it should in summer-time be conveyed into a much colder water than that wherein it was before, it is soon destroyed. In the mean time, they say, it can live out of the water five or six days, provided the north wind blows at that time: it feeds upon roots, herbs, fish, insects, and any thing it can find in the bottom of rivers. Athenæus says, he had seen eels in a certain country, which were so far tamed, that if they offered them any thing to eat, they would come and take it out of the person's hands. This fish lives commonly seven or eight years.

The eel is good aliment, and much used; it is tender, soft, and nourishing, because it contains many oily and balsamic parts: it has also a great many that are dull, viscous, and gross, which make the eel hard of digestion. They eat eels either roasted or boiled: those that are roasted seem to be more wholesome than the other; and the reason is, because they are thereby the more digested of their viscous phlegm, than by the other way. They should also be well seasoned, and you should drink good wine upon them, in order to help the digesting of their phlegm

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phlegm in the stomach. The fat of an eel is looked upon to be good to take away the signs of the small-pox in the face, to cure the piles, and to make the hair grow: it is also put into the ears to help hearing. They make a kind of mucilage of eel's skin, by steeping and boiling it in water, which is applied to swellings, in order to the softening and dissolving of them; it is good for hernia's. *Lemery on Foods.*

THE CONGER, OR CONGER EEL.

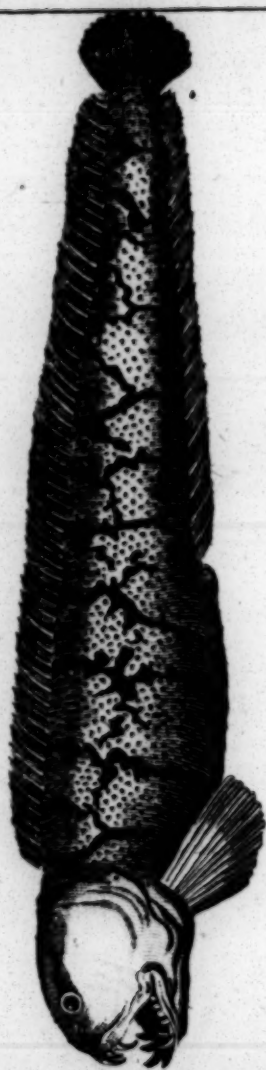
THIS fish grows to an enormous size. Dr. Borlase assures us, that they are sometimes taken near Mount Bay of one hundred pounds weight: and we have been informed, that some have been taken near Scarborough, which were ten feet and an half in length, and eighteen inches in circumference in the thickest part. The shape of the conger eel is somewhat like that of the common eel; but they differ from it in the following particulars: their colour is darker, their eyes are much larger in proportion, and the iris is of a silver colour. On each side it has a straight white broadish line, extending from the head to the tail, which

which seems composed of a double row of points. The fin placed on the body has its upper edge blackish throughout the whole length. The conger has more bones than the common eel ; and the end of the snout or upper chap is furnished with two short horns or tubes, from which a liquor may be squeezed out ; but this is not to be depended upon, being sometimes found in both kinds, and sometimes entirely wanting in both kinds.

Though a sea-fish, it is supposed they generate like the fresh-water species : innumerable quantities of what are supposed to be their fry, come up the Severn about the month of April, preceding the shads, which it is supposed migrate into that river to feed on them. Congers are extremely voracious fish, preying upon other fish. They, as well as other eels in general, are remarkably fond of carcases of any kind, and are frequently found lodged in those that have been accidentally taken up. Congers are an article of commerce in Cornwall ; great quantities being taken on that coast, and exported to Spain and Portugal.

Fishermen are much afraid of a large conger, lest it should endanger their legs by clinging round them ; therefore they
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kill them as soon as possible, by striking them on the navel.

In curing them, they are slit, and hung on a frame to dry; having a vast quantity of fat, which it is necessary should exude before they are fit for use. It is said, that a conger of an hundred weight will waste by drying to twenty-four pounds.

THE WOLF FISH, OR SEA WOLF.

THIS animal has a smooth slippery body without scales. It somewhat resembles an eel, but is of a brownish grey, and the sides are adorned with blackish transverse shades. The head is large, and flat above the eyes, and the cheeks appear swelled and puffed out. It is a most voracious fish, and, when taken, will fasten on any thing within its reach. The fishermen, dreading its bite, endeavour to disarm it as soon as possible; they immediately pull out its fore-teeth, and then kill it by striking it behind the head. The Danish and German writers say, that its bite is so hard that it will seize on an anchor, and leave the marks of its teeth in it; and that the animal is capable of crushing even stones

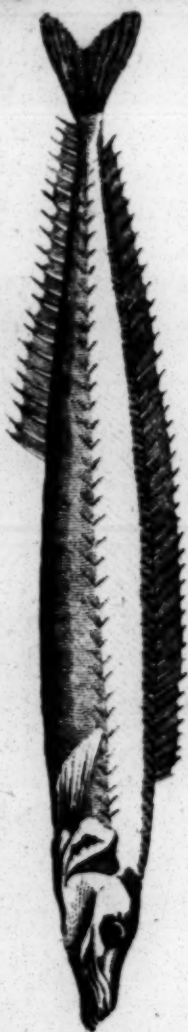
stones with its jaws. It feeds principally on crustaceous animals and shell-fish.

They are taken in the sea near Yorkshire and Northumberland: on the Yorkshire coast they have been found of the length of four feet; and Dr. Gronovius informs us, that they have been taken near Hitland upwards of seven feet long. This fish has so disagreeable an aspect, that nobody at Scarborough, except the fishermen, will eat it, and they prefer it to holibut.

The body of the wolf-fish is long, and a little compressed sideways, and the skin wants the lateral line: the tail is round at the end, and consists of thirteen rays: the sides, back, and fins, are of a livid lead colour, and the sides and back are marked downwards with irregular obscure dusky lines.

THE SAND EEL, OR LAUNCE.

IT resembles the common eel in shape, being long and round, but it seldom exceeds nine or ten inches in length. The colour of the back is blue, varying with green; the sides and back are of a silver white. It is destitute of scales, has a sharp snout, and a wide mouth without teeth.



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teeth : the lower jaw is longer than the upper, and the upper jaw is moveable, and capable of being protruded ; so that, when open, the gape is very wide. It has a long fin, which extends almost the whole length of the back, is very narrow, and consists of fifty-eight rays : there is also a pair of fins at the gills, but none on the belly. The iris is silvery. The tail is forked, but the lobes are rounded at their extremities.

These fish are found in most of our sandy shores, during some of the summer months : on the recess of the sides they conceal themselves about half a foot in the sand, in those places where the water is left at the depth of about a foot ; and the fishermen of Cornwall, and the Isle of Man, search for them with hooks provided for that purpose. They are very delicate eating, but they are generally used as baits for other fish. The female is longer and slenderer than the male.

THE SWORD FISH.

THE snout of this fish is the upper jaw produced to a great length, and has some resemblance to a sword, from whence it takes its name. They have been

been seen upwards of fifteen feet in length, and two hundred pounds in weight. The head is thick, the body is long and round, but grows gradually smaller towards the tail. The snout is one third of the whole length of the fish, and is compressed at the top and bottom, but sharp at the point : the under jaw is about four times as short as the upper, and is also sharp-pointed. The mouth is destitute of teeth.

The skin of the sword-fish is rough but very thin : the colour of the back is dusky, that of the belly a silver white. The dorsal fin begins a little above the gills, and extends almost to the tail. The tail is forked, and almost in the shape of a crescent, and it has only one pair of fins at the gills.

The sword-fish is extremely voracious, and particularly a great enemy to the tunny.

It sometimes frequents our coasts, but is much more common in the Mediterranean sea, especially in that part which separates Italy from Sicily, which has been long celebrated for it. The Sicilians, who are very fond of it, buy it up very eagerly, and, at its first coming into season, give about six-pence Eng-

lish

fish per pound for it. The season for it continues from May till August. The antients cut this fish into pieces, and salted it, whence it was called *tomus thurrianus*, from *Thurii*, a town in the bay of Tarentum, famous for taking and curing it.

The antient method of taking the sword-fish is particularly described by Strabo*, and agrees exactly with that practised at this day by the Italians and Sicilians. A man ascends one of the cliffs that over-hangs the sea to observe the motions of these fish. As soon as he perceives any, he gives notice (by signs before agreed upon) of the course it takes: a fisherman, who is stationed in a boat, climbs up the mast, and on seeing the sword-fish, directs the rowers which way to steer. When he thinks he is within reach, he immediately comes down, and strikes a spear or harpoon into its body; the handle of which being loose in the socket, separates from it, while the iron part, which is fastened to a long cord, remains in the body. The fish is then suffered to weary itself with flouncing in the water, and afterwards is drawn into the boat.

* Lib. I. p. 16.

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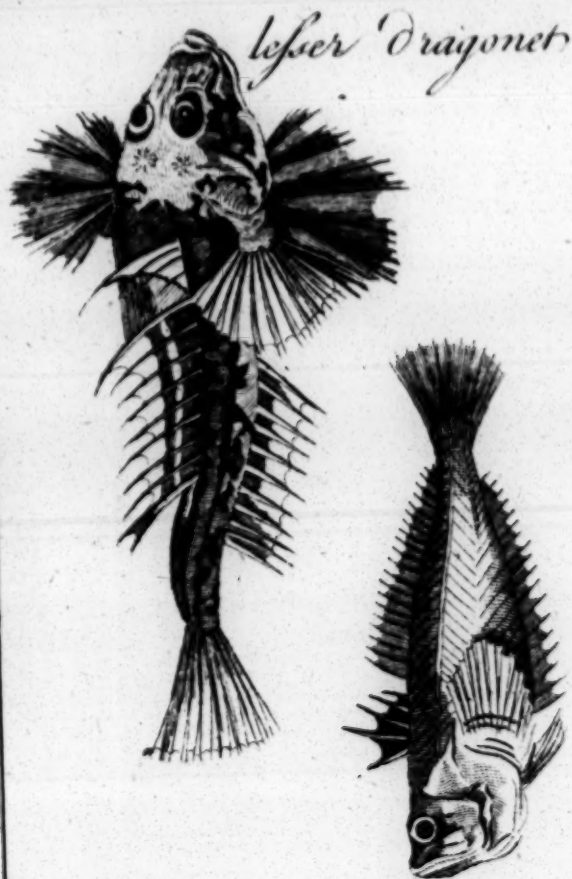
* Lib. I. p. 16.

THE DRAGON FISH.

THE head of this fish is large and flat at the top; there are two orifices in the hind part, through which it breathes, and through which it also forces out the water it takes in at the mouth, in the same manner as the cetaceous fish. The eyes, which are large, are placed very near each other on the upper part of the head, so that in their natural position they look upwards: the pupils are of a rich sappharine blue, and the irides of a fine yellow. The upper jaw projects much farther than the lower; the mouth is very wide, and the teeth are small. It is found as far north as Spitzbergen, and as far south as the Mediterranean sea. It is also frequently seen on the Scarborough coasts. The colours are yellow, blue, and white; the fish making a beautiful appearance when it is just taken.

This species grows to the length of about ten inches: the body is slender, round, and smooth.





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THE SMALL DRAGON FISH.

THIS species is of a yellowish green colour on the back, and white on the belly; the sides are speckled with small spots of a blueish silver colour. It may be distinguished from all other small fish by the spots just mentioned, by the round holes of the gills, by three pointed prickles at the corners of the gills, by the rays of the fore back-fin rising higher than the membrane that connects them, and by the jaws being furnished with exceeding small teeth. The mouth is small, the eyes large, and almost contiguous. The small dragon fish is seldom seen to exceed six or seven inches.

THE WEAVER.

THIS fish is also called the sea dragon. It is a long fish, with flat sides, straight back, and a prominent belly. The lines on the sides are partly yellow, and partly dusky, running obliquely from the back to the belly; the scales are thin and small, and the head moderately compressed: the eyes are placed on the top of the snout, and very near together.

The iris of the eyes is yellow; the under jaw is longer than the upper, and slopes very much towards the belly: the teeth are small; the forward back-fin has six rays; the fin behind this, and which is almost close to it, reaches very near the tail.

The antients were well acquainted with the qualities of this fish, and mention them without any exaggeration: the wound inflicted by the spines that form the dorsal fin are exceedingly painful, attended with a violent burning, and most urgent shooting; and, if the person who receives it is in a bad habit of body, it sometimes occasions an inflammation that will extend from the arm to the shoulder. Some are of opinion, that these symptoms proceed from something more than the small wound the fish is capable of inflicting. The common remedy used by fishermen is the sea-sand with which they rub the place affected for a considerable time. In the Universal Museum for 1765, mention is made of a person who was dangerously wounded by this, and was cured by the application of sweet oil, and taking opium and Venice treacle.

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This fish grows to the length of twelve inches. It buries itself in the sands somewhat like the sand-eel, leaving only its nose out; and, when trod upon, strikes with great violence. Notwithstanding this noxious quality of the spine, the weaver is very delicate food.

THE COMMON COD FISH.

THE cod inhabits only the northern part of the world: it seems confined between the latitudes sixty-six and fifty: those which are caught either north or south of those degrees, being few in number, and bad in quality.

Immense quantities of cod fish inhabit the banks of Newfoundland, and the other sand banks that lie off the coasts of Cape Breton, Nova Scotia, and New England. It is probable they are tempted to resort there on account of the quantity of worms produced in those sandy bottoms. Another cause of their particular attachment to these spots, is their vicinity to the polar seas, where they return to spawn.

The fishing banks of Newfoundland are a sort of mountains covered with the sea: one of these is deservedly called the

Great Bank, for it extends four hundred and fifty miles in length, and upwards of one hundred in breadth. It is about seventy-five miles from the island of Newfoundland, in America: the largest, best, and fattest cod, are those taken on the south side of the bank; those on the north side being considerably smaller. The season for catching them on this bank, is from the beginning of February to the beginning of May. Those that are taken in May and June will keep tolerably well; but those which are caught in July, August, and September, will spoil in a very short time, unless extraordinary care be taken of them. Sometimes, indeed, this fishing is over in a month or six weeks, and at other times it continues upwards of six months.

When Lent approaches, the fishermen hasten homewards, though they have not caught above half of their cargo, because the markets at that time are best. Sometimes, however, they make a second voyage, before others have got a sufficient cargo for the first. They are all taken with a line and hook baited with the entrails of cod-fish, a small fish called capelin, and a shell-fish called

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chams; and an expert fisherman will catch four or five hundred in a day.

On the north of Iceland, very few are taken; but on the south and west coasts they abound. They are found in great plenty on the coasts of Norway, in the Baltic, and off the Orkney and the western isles; after which their numbers gradually decrease, as they advance towards the south; and before they reach the mouth of the Straights of Gibraltar, they seem entirely to cease.

Before Newfoundland was discovered, the principal fisheries of cod were in the seas of Iceland, and of our western isles; which were the grand resort of ships of all the commercial nations; but the greatest plenty was found near Iceland. This evidently appears, for queen Elizabeth condescended to ask Christian the Seventh of Denmark permission to fish in those seas; though she afterwards repented of her request, and instructed her ambassadors at that court, to insist on the right of a free and universal fishery.

The encrease of shipping that now resort to the fertile banks of Newfoundland is astonishing. Great Britain still enjoys the greatest share; which ought to be esteemed as our greatest treasure, as
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it brings strength to the state, and wealth to individuals.

Providence hath benevolently ordained, that this fish, so useful to mankind, should be so very prolific as to supply more than the deficiencies of the multitudes annually taken. Leuwenhoek counted nine millions, three hundred and eighty-four thousand eggs in a cod-fish of a middling size.

They begin to spawn, in our seas, in the month of January, and deposit their eggs in rough ground among rocks.

Those fish are most esteemed for the table, which are of a middling size, and they are to be chosen by their plumpness or roundness, especially near the tail, and by the regular undulated appearance of the sides, as if they were ribbed. These, and other fish of this genus, are in the highest season in winter; but the glutinous parts about the head lose their delicate flavour, after they have been twenty-four hours out of the water.

The general weight of those taken on our coasts is from fourteen to forty pounds, though they are sometimes found to weigh sixty or seventy pounds.

The cod-fish is short in proportion to its bulk; the belly is very large and prominent:

minent : the jaws are of an equal length, with a small beard on the lower jaw ; the teeth are disposed in the palate as well as the jaws : the eyes are large. This fish has three soft fins on the back : the ventral fins are very slender ; and it has two anal fins. It is ash-coloured on the back and sides, and usually spotted with yellow : the belly is generally white ; though they sometimes vary not only in colour, but in shape, especially that of the head. It has a side line, which is broad, straight and white, till it reaches opposite the vent, when it curves towards the tail.

Cod-fish are salted in the following manner on board the ships : the head is cut off, the belly opened, and the guts taken out ; and then they are laid side by side, head to tail, at the bottom of the vessels, for about eight or ten feet square. One layer being compleated, it is covered with salt, and another laid upon that, which is covered as before. All the fish that are taken in one day are thus disposed of ; but great caution is used not to cure those which have been caught on different days. They remain thus for three or four days, and are then removed into another part of the vessel,
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and salted again. They are suffered to remain thus till the vessel has procured its full cargo, or till they depart for their destined port. Sometimes they are put into barrels and packed up, and they then go under the denomination of barrel-cod.

These fish, however, are not always salted, for some are dried on shore. Such are fished for along the coast of Placentia in Newfoundland, from Cape Race to the Bay of Experts; within which limits, there are several commodious harbours and places to dry the fish in. Those who mean to dry them in the sun, always take them in the summer season, that being the only proper time for that purpose. A smaller sort of fish are usually chosen for drying, because, as they sooner take salt, they are fittest for the purpose.

The tripes, tongues, and rows of the cod-fish, are also salted and barrelled up; the latter of which are of service to throw into the sea, in order to draw other fish together, particularly pilchards. An oil is taken from this fish, which answers all the purposes of train oil, and is much used for dressing leather.

THE

THE TORSK.

THIS fish is much esteemed for its delicacy. On being boiled, the meat divides into flakes like that of a salmon. The head is small; the upper jaw somewhat longer than the lower. The belly is a little prominent; the side line white, broad, and placed nearer the back than the belly. It never grows to a large size, seldom exceeding thirty inches in length. These fish are found in great quantities in the Baltic and the northern seas, particularly in Brassa Sound, where it is called the tusk, and about the Orkney Isles. It is indeed supposed, that they never wander into the more southern seas.

THE HADDOCK.

THE haddock is of a middle size between a whiting and a cod. The back is blackish, and covered with small scales. A black line extends from the upper corner of the gills to the tail; and on the middle of each side, not far from the gills, there is a large black spot, which distinguishes it from all others: the belly and lower parts of the sides are silvery.

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The eyes are large; a barb hangs from the lower jaw, and the tail is forked. In other respects it resembles a cod; and particularly on the back, are three fins, resembling those of the common cod. Superstition assigns this mark to the impression St. Peter left with his finger and thumb, when he took the tribute out of the mouth of a fish of this species, which has, ever since that miracle, been continued to the whole race of haddocks.

Large haddocks begin to be in roe about the middle of November, and continue so till the end of January; from which time, till May, they are very thin tailed, and much out of season. The small ones are extremely good from May till February; and those which are not old enough to breed are good in February, March, and April.

The grand shoal of haddocks comes periodically on the Yorkshire coasts. They appeared on the tenth of December, in 1766, and exactly on the same day in 1767: these shoals extended near three miles in breadth from the shore, and, in length, from Flamborough-head to Tinmouth Castle. Three fishermen within the distance of a mile from Scarborough-harbour, frequently loaded the

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boat with them twice a day ; taking each time about a ton of fish. If they threw their lines beyond the distance of three miles from the shore, they caught only dog fish ; a circumstance which shews how exactly these fish observe their limits.

The largest of the haddocks were sold for eighteen pence to a shilling a score ; and the smaller sort were sold for a penny, and sometimes an half-penny per score.

This species, which is the most common in the London markets, seldom grow very large ; one of fourteen pounds being of an uncommon size, and extremely coarse : those of two or three pounds are the best for the table.

As soon as large haddocks are out of season, they quit our coasts, and leave behind them a great number of small ones.

THE WHITING.

THE whiting is a fish of an elegant make, and differs from all other fish of this kind, in having the upper jaw longer than the lower ; and in the teeth, which appear out of the mouth when it is shut. It has no barb, and the belly
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fins are placed more forward than they are in the others. It is a slender fish of its size, especially towards the tail, for about the head it is considerably larger in proportion. The head and back are of a pale brown, the belly is silvery; the lateral line is white and crooked: the fins below the vent are speckled with black. The scales are small; the eyes are large, and covered with a transparent loose skin.

They are the most delicate as well as the most wholesome of any of the genus but never grow very large; the usual length being ten or twelve inches, though they have been seen twenty inches long. In spring they appear in vast shoals in our seas, from half a mile to three miles from the shore. Vast numbers of them are taken by the line, and they afford excellent diversion to the anglers.

The fishing for whittings in a boat or smack is diversion enough, because they bite very freely, and require no very nice tackle to catch them. You may know where to cast anchor by the sea gulls, for they never fail to hover over the place where the whittings lie, and if they see you to dip into the water every now and then you are sure not to lose your labour.

At Portsmouth, the tradesmen frequently get small smelts as baits, and find good diversion amongst the whittings; but if smelts are not to be had, a muscle, a herring, a hairy worm, a lob, or a marsh worm, are good baits. You need not use any rod, but a *Pater-noster* line, with half a dozen hooks half a yard distant from each other. The line may be fastened to the inside of the boat, by which means you will have but little trouble, except in drawing up your fish, and putting on fresh baits. The time of waiting before you examine your hooks need not be long, for they are a very greedy fish.

THE WHITING-POUT.

IN proportion to its length, the whiting-pout is extremely broad, by which it may be distinguished from all others of the kind. The extremity of the tail and fins are blackish, and there are large black spots at the roots of the gill fins on each side. It never grows to a large size, seldom exceeding eleven or twelve inches in length. The back is very much arched, the mouth small, and the beard short. The colour of the body is

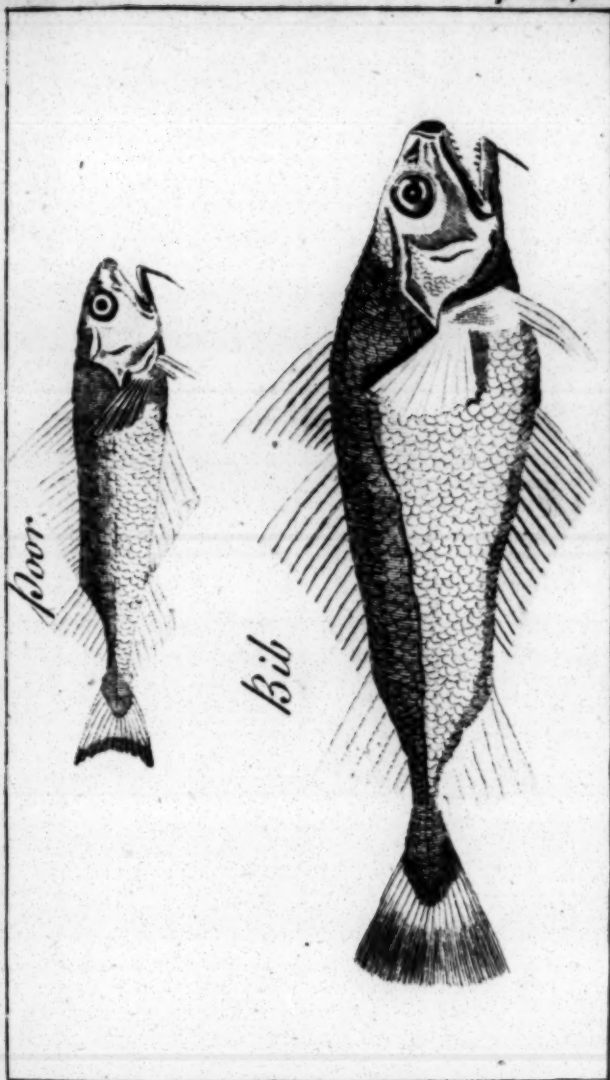
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whitish, but more obscure on the back than on the belly. The lateral line is white, broad, and crooked. The back fin, which is of a triangular form, is produced into a longish horn: the tail is even at the end, and the scales are small. The young of these fish are called Whiting maps in London, where they are generally very plenty in the month of October.

THE BIB OR BLIND.

THE bib has a barb under its chin, in which particular it agrees with the cod, but it differs from it in size, shape, and colour; being shorter, broader, and whiter. The scales adhere closely to the skin, and are twice as large as those of the cod. The cod is also furnished with a spine or thorn at the tail fin, of which this fish is destitute: it grows to the length of eleven or twelve inches: the body is deep, and the sides compressed: the eyes are covered with a loose membrane, which it is said the fish can blow up like a bladder: the mouth is small, and the teeth are disposed like others of the kind. It is esteemed delicate food, and resembles the whiting in taste.

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THE POOR.

THE poor is the only species of cod-fish with three dorsal fins that has hitherto been found in the Medirerranean sea. It is found near Marseilles, and sometimes in such amazing quantities as to become a perfect nuisance; for no other kinds of fish are taken during that time. It is pretty good for food, but cannot be either salted or dried. It is a very small species, not exceeding six inches in length. The back is of a light brown colour, and the belly of a dirty white; the eyes are covered with a loose membrane: on the chin is a small beard; and on the gill-covers, and the jaws, there are nine punctures on each side.

THE COAL FISH.

THIS fish is called the Rawling Pollock in Cornwall. It takes the name of coal-fish from the colour it sometimes assumes. These fish are common on most of our rocky and deep coasts, but particularly those of Northumberland, Yorkshire, and Cornwall. The flesh is not so good as that of a cod, though it is su-

perior to that of a haddock. The form of the coal-fish is more elegant than that of the cod ; they grow to the length of two feet and an half, and weigh about twenty-eight or thirty pounds at most. The head is small, the under jaw a little longer than the upper, and the iris is silvery, marked with a black spot on one side. The young appear at the beginning of July, in vast shoals on the Yorkshire coast ; they are at that time about an inch and an half long. In the month of August, they are from three to five inches in length, at which time they are taken in great numbers with the angling rod, and are then esteemed a very delicate fish. When large they are salted, and dried for sale.

THE POLLACK, OR WHITING POLLACK.

THIS is larger than the common whiting, but nearly of the same shape ; it is indeed a little broader, and not quite so thick ; the back is of a dirty green colour. It differs from a cod fish in being smaller, broader and thinner ; in having a lesser head, in being destitute of a barb, and in having the lower pair of fins much smaller.

smaller. The sides, beneath the lateral line, are variously streaked with a dusky yellow, and the body is scaly; but the scales are very small. The mouth is large, the teeth small; the eyes are of a silver colour, and large; the under jaw is longer than the upper; the head and body rises pretty high, as far as the first dorsal fin. The colour of the back is generally dusky; though in some it is inclining to green. The sides beneath the lateral lines are marked with lines of yellow, and the belly is white.

These fish are common in many of our rocky coasts. In summer they are seen in great shoals frolicking on the surface of the water, and throwing themselves into variety of forms. At that time they are so wanton as to bite at any thing that appears on the top of the waves, and are frequently taken with a goose's feather fixed to the hook. They are a good eating fish, but never grow to a very large size; they seldom exceed seven or eight pounds in weight.

The teeth of the pollack are said to be absorbent when reduced to powder, and good against fluxes and spitting of blood.

This

This fish has the English name of whiting-pollack bestowed upon it, from its likeness to a whiting. However, it is larger, proportionably broader, and not quite so thick. He lives upon fish, particularly sand-eels, and is frequently taken near Penzance and St. Ives, in Cornwall; and is likewise often caught in rock-fishing. He struggles hard for his life, and yields the angler good diversion. Proper baits in rock-fishing, are small smelts, a live shrimp, a cockle, a perriwinkle, a lobster, a marsh-worm, and a hairy worm, that is found under the sand at the tide of ebb. This last, as it is the most natural, so it is the most successful bait; besides, it has this advantage, that it needs no scowering as other worms do.

If you fish out of a boat or smack, you will require no rod, and your line may be sixty yards long, with three or four hooks one above another, and baited with different baits. Some inches above the highest hook must be fixed about half a pound of lead. When you fish, you must coil your line in several rings in your left hand, and holding your lead in your right, throw it as far into the sea as you can, taking care to hold the

the loop of your line fast in your hand, lest you lose it. The best time for sea-fishing is in warm weather, and early in the morning, or after sun-set, provided the tide has been ebbing near an hour.

Some in this kind of fishing choose to place themselves under the covert of a rock, where they shelter themselves, and sit secure from the inclemencies of the wind and weather, and this, in a proper sense, may be termed rock-fishing. In this case a rod is necessary, as likewise a float. It is common to use two hooks, one to lie at the bottom, and one to hang about mid-water; and if a little mischievous fish, called a miller's-thumb, should happen to carry your bait into the clefts of the rocks, you must have patience till he thinks proper to come abroad, for there is no dealing with him by force.

THE H A K E.

THESE fish are from a foot and an half to two feet and an half in length. It is of a slender form, like that of the river-pike, and is therefore sometimes called the sea-pike. The back is of a pale ash-colour, and the belly of a dirty white,

white, with small scales. The head is broad and flat, and the mouth large, and full of sharp teeth, like that of a pike: the eyes are large, and of a gold colour, being covered with a transparent membrane. The tail is not forked, but terminates in a right line.

The hake is from a foot and an half to near twice that length: it is esteemed a very coarse fish in England, and is seldom admitted to table either fresh or salted. It is known by the name of *poor John* when it is cured.

There was formerly a vast stationary fishery of hake on the Nymph Bank, off the coast of Waterford; but Mr. Smith, in his history of Waterford *, complains of its decline. The irregular migration of fish is sometimes owing to their being pursued and harrassed by an unusual number of fish of prey; and sometimes from a deficiency of the smaller fish, which served them as food.

There is also a fish called the lesser hake, which is found from eleven to eighteen inches long. It is of a pale ash-colour.

* Page 216.

THE L I N G.

THIS fish takes its name from its length, being a corruption of the word long. It resembles the hake both in shape and colour, except that it is longer, and its scales are not closely adhering to the skin. The body is slender; the head flattish; the upper jaw longer than the lower: the teeth in the upper jaw are small and very numerous; those in the lower are few, slender, and sharp. It has a small beard on the chin. The tail is round, not forked; and on the back fin there are a multitude of rays. The usual size of a ling is from three to four feet in length; but they are sometimes upwards of seven feet long.

The flesh is much better and wholesomer than that of the hake, and is indeed, when cured, preferred to all other salt-fish.

They abound about the Scilly Isles, on the coasts of Scarborough, and those of Scotland and Ireland, and form a considerable article of commerce: it was even considerable so long ago as the reign of Edward the Third, an act being made
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in his 31st year for regulating the price of lob, ling, and cod.

Great quantities are salted for exportation, as well as for home consumption. When cut or split for curing, it must measure at least twenty-six inches from the shoulder to the tail : if smaller than that, it is not reckoned a sizeable fish, and therefore is not entitled to the bounty on exportation.

They are in perfection in the Yorkshire seas, from the beginning of February to the middle of May. In June they spawn, and deposit their eggs in the soft oozy ground of the mouth of the Tees. The males, at that time, separate from the females, and resort to rocky ground near Flamborough-head, where the fishermen take vast quantities, without ever finding a single female among them.

The liver of a ling is extremely white, so long as the fish continues in season, and abounds with a fine flavoured oil ; but as soon as it goes out of season, the liver becomes very red, and affords no oil. This is, in some degree, the case with cod and other fish, but the difference is not so very remarkable.

THE BURBOT, OR EEL POUT.

THE body of this fish has some resemblance to that of an eel, except that it is shorter and thicker: its motions also resemble those of the eel; and it is equally smooth, slippery, and slimy. The head is broad and depressed like that of a toad, and the jaws are furnished with very small teeth, which make them as rough as a file. The tail is flat and roundish. A barb of about half an inch long grows on the under jaw; and there are two short barbs between the nostrils and the snout. The colour of this species varies; some being dusky, others of a dirty green, spotted with black, and sometimes with yellow.

The burbot is found in the Trent, the Witham, and in the great Eastfen, in Lincolnshire. Though of a very disgusting appearance when alive, it is a very delicate fish for the table. It is extremely voracious.

They are in great plenty in the lake of Geneva, where it is known by the name of the lota. They are seldom found in our waters above the weight of two or three

three pounds, but they are considerably larger in some places abroad.

Their places of resort are the same as the eels, if within the reach of the tide, and the best time to take them is after a storm of thunder and lightning with heavy rain. The best bait for them is a small gudgeon, roach, or dace; your hook should be armed, on account of his sharp teeth, and because he is a vigorous strong fish, and struggles hard for life. His flesh is good and sweet, and greatly esteemed. His usual size is from fourteen to twenty inches.

THE SEA LOACH.

THIS is termed the whistle-fish in Cornwall. It is from nine to twelve inches in length, and the head is large and flat. Its mouth resembles that of an eel, furnished with numerous small teeth, disposed along the jaws in the form of a broad plate: it has also a set of small teeth, disposed in a triangular form, in the roof of the mouth. The eyes are near the end of the snout, and their iris is of a silver-colour. The scales are very small, and the head, back and sides, are variegated with large spots.





Viviparous Blenny



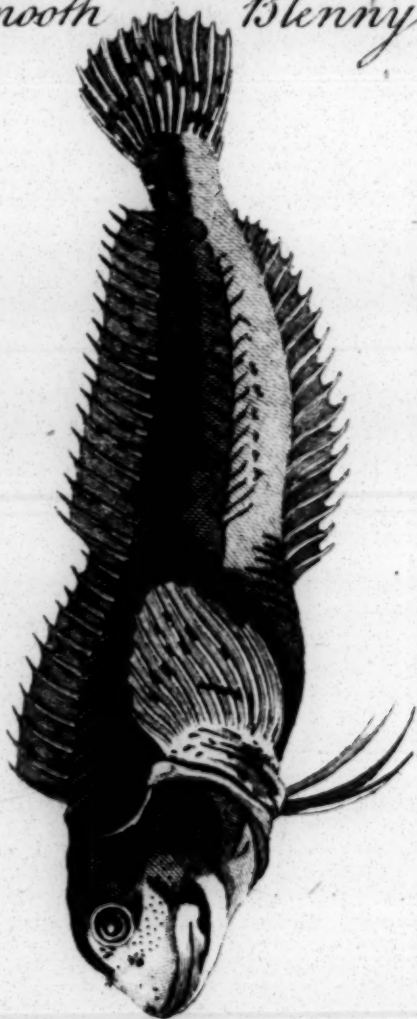
Spotted Blenny



Spotted Goby



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of a darkish red. In a dent or furrow near the middle of the back, instead of a fin, there is a low membrane, or skin, edged with very small hairs; by which it may be distinguished from all other fish of this kind. It varies greatly with regard to the spots: sometimes they are red, sometimes white, and sometimes it has no spots. The colour of the head and body are of a reddish yellow; but the sides are lighter, and the belly almost white. This species usually frequents the rocky shores of these islands, and is sometimes taken with a bait.

THE CRESTED BLENNY.

THIS is sometimes found on our rocky shores, and is usually about four or five inches in length. On the head it has a small crest-like fin, which it can erect or depress at pleasure. It has a triangular lump on the top of the head, between the eyes, which is red about its edges. The colour is brown and spotted, and the body is slippery and smooth.

THE SMOOTH BLENNY.

THE length of this fish is about five or six inches: the head is large, and
O 2 sloping

sloping suddenly to the mouth : the iris is red : the teeth are sharp, slender, and close set : it has twenty-four in the upper, and nineteen in the lower jaw. The tail consists of twelve branched rays, and is rounded at the end. Some of these are black ; others of a deep olive colour, marbled with a deeper tint ; and others are spotted with white. This fish is very tenacious of life, and will live almost a whole day out of water. It feeds on shells, and small crabs.

THE SPOTTED BLENNY.

THIS species, and the smooth blenny, are found in great plenty, lying under the stones among the tang, on the rocky coasts of Anglesea, at the lower water-mark, and is used as a bait for larger fish. It is about six inches in length, and half an inch in depth : the sides are very much compressed, and extremely thin : the mouth is small, and the iris of the eye is whitish. The pectoral fins are of a yellow colour and rounded ; and, instead of the ventral fins, there are two minute spines. The back and sides are of a deep olive colour, and the

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THE VIVIPAROUS BLENNY.

THIS species is generally about a foot in length, and of an eel-like form : the skin is smooth and slippery. The back and head are of a yellowish brown, stained with black strokes : the sides are a little lighter, and the belly of a dirty white. It has two small beards at the nostrils, the jaws are rough, and the covers of the gills are open. It is viviparous, as may be imagined from the name, and brings forth two or three hundred young at a time. Their season of bringing forth is a little after the depth of winter. Before Midsummer they quit the bays and shores, and retire into the deep, where they are usually taken. They are a coarse fish, and but little esteemed as food.

THE SEA GUDGEON, OR ROCK FISH.

IT is a soft slippery fish, of a slender form, and about six inches in length. It is covered with small rough scales.

It is variegated with a mixture of white, yellow, brown, and other colours, interspersed with black spots: there are also transverse streaks of an orange colour. The head is rather large, the cheeks inflated, and the mouth is armed with a double row of rough teeth. The ventral fins coalesce, and form a sort of funnel, having the appearance of a double fin in the middle of the breast: this enables them to stick close to the rocks, from whence they have obtained the name of the rock-fish. The eyes are small and yellow, looking upwards, and placed pretty near each other. The tail is rounded at the end. This fish is often taken on the coast of Cornwall, and is common in the fish markets of Venice. The flesh is fat, tender, and delicate.

THE BULL-HEAD, OR MILLER'S T H U M B.

THIS species is very common in all our clear brooks: it is about four or five inches in length, with a large broad depressed head of a roundish shape. The gill fins are round, and notched on the circumference. The eyes are small; the iris of the eyes is yellow: the teeth are
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very minute, and placed in the jaws and the roof of the mouth. The body grows slender towards the tail, and is very smooth. At the beginning of the cover of the gills, on each side, there is a crooked prickle. The colour of this fish is as disagreeable as its form; being dusky, mixed with a dirty yellow; the belly is whitish. It usually lies at the bottom of a stream, either on the gravel, or under a stone: it forms a hole in the gravel, where it deposits its spawn, and quits it with great reluctance. It feeds on water insects.

THE POGGE.

THIS fish seldom exceeds five inches and an half in length, and very seldom arrives even at that size: it has a triangular depressed head, which is about two inches broad, and very bony and rugged. The end of the nose is armed with four short upright spines, and on the throat are a number of short white beards. The teeth are very minute, and situated in the jaws. The body, which is octagonal, is covered with a number of strong bony crusts, divided into several compartments; the ends of which project

project into a sharp point. It is covered all over with bony scales, in the middle of each of which there is a hooked tubercle, which makes the fish appear full of angles. The pogge is very common on most of the British coasts.

THE FATHER LASHER.

THIS is also called the sea-scorpion : it is no uncommon fish on the rocky coasts of this island : it lurks under stones, and will take a bait. It seldom exceeds eight or nine inches in length, and its form resembles that of a bull-head. Its head is very large, and has a most formidable appearance ; being armed with large spines, which it can oppose to any enemy that attacks it ; by swelling out its cheeks and gill covers to a very large size. The head is covered with prickles ; the body is small, and the belly broad and flat. Above the lateral lines on the back, there are four roughish broad transverse spaces of a blackish colour ; but the intermediate spaces are paler. The covers of the gills are connected below, appearing like a mantle thrown over its head and shoulders. The colour of the body is brown,

or

or dusky and white marbled ; and sometimes it is stained with red : the belly is of a silvery white. The fins and tail are transparent, sometimes clouded, and the rays are regularly barred with brown. The nose, and the face contiguous to the eyes, are furnished with short sharp spines : the covers of the gills are terminated by exceeding long ones, which are very strong and sharp-pointed. The mouth is large, and the jaws are covered with rows of very small teeth : the roof of the mouth is furnished with a triangular spot of minute teeth. This species abounds in the Newfoundland seas ; and on the coast of Greenland, in deep water near the shore. It is a principal food of the natives, and the soup made of it, is said to be both agreeable and wholesome. It will live a considerable time out of the water. Its food is shrimps, sea insects, and the young fry of fish.

THE DOREE, OR GILT FISH.

IT has a broad compressed body, not much unlike that of a flounder ; but it swims erect. The head is very large and compressed, and the mouth is extremely wide. The colour of the sides is olive,
with

with a large round black spot on each; by which it may be distinguished from other fish of this kind. In short, the form of this fish is hideous; the body is oval; the eyes large, and the irides yellow. The lateral line is very much distorted, sinking at each end, and rising near the middle of the back. The first dorsal fin consists of ten strong spiny rays, with long filaments reaching far beyond their ends. The second, which is placed near the tail, consists of twenty-four soft rays; the middlemost of which are the longest. The pectoral fins have fourteen rays, and the ventral seven: it has also two anal fins. The tail is round at the end, and consists of fifteen branched rays. They never grow to a great size; one of the weight of twelve pounds being considered as a very large fish. It is called the doree, or gilt fish, on account of its shining appearance when alive.

It was very long before this fish attracted our notice as an edible one: the vulgar prejudices on account of its deformity, deterred our ancestors from venturing to eat it; but that judicious actor and bon vivant, Mr. Quin, has effectually established its reputation, and added a most delicious repast to our table.

This

This fish is found not only in the southern seas of this kingdom, but also on the coast of Anglesea. Those of the largest size are taken on the Bay of Biscay, off the French coasts : they are also very common in the Mediterranean.

THE HOLLIBUT.

THIS is the largest of all flat-fish in these parts of the world ; it greatly exceeds a turbot in size, and is of a longer make. Some have been taken in our seas, weighing from one to three hundred pounds. In the seas of Newfoundland, Greenland, and Iceland, they are found much larger.

The hollibut, with respect to its length, is the narrowest of any of this genus, except the sole. It is perfectly smooth and free from spines, either above or below. The colour of the upper part is dusky ; that of the lower part of a pure white. The eyes are placed on the right side, or to the left of the mouth : the fins are at a greater distance from the head than in other flat fish. In both the upper and the lower jaws it has a double row of teeth, which are very sharp, and somewhat crooked at the end. It has
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very sharp prickles on the gills. It swims sideways.

Of all flat fish the hollibut is the most voracious. They are common in the London markets; where they are exposed to sale cut into large pieces. They are by some supposed equal to the turbot, but in general they are thought very coarse eating; excepting the part which adheres to the side fins, which is extremely delicious.

THE PLAISE.

THE back of this fish is of a dirty olive colour, or brown, and speckled with roundish red spots; of which there are some also on the fins. The belly is white. The eyes are on the right side, to the left of the mouth; and, at the upper edge of the coverings of the gills, there are seven bony tubercles, or warts; the fifth from the eyes being the highest and the largest. There is a row of teeth in each jaw, and a cluster of teeth on the palate. One of the nostrils is seated on the upper side, near the eyes; and the other on the lower side under the eyes. The tail is long, and roundish at the end.

These

These fish are very flat. They are common on most of our coasts, and are sometimes taken of the weight of fifteen or sixteen pounds : but they are very rarely found of that size, one of seven or eight pounds being reckoned a large fish. The largest are taken off Rye, on the coast of Suffex, and also off the Dutch coasts. They spawn about the beginning of February.

THE D A B.

THIS fish is somewhat thicker than the plaice, but smaller. It is found with the other species, but it is less common. The scales are small and rough on the edges ; in which it differs from the plaice, as well as in not having any tubercles near the head, nor red spots. But the eyes are situated like those of the plaice ; and the colour on the upper part is of a dirty olive, with a reddish cast, and some spots of a dusky yellow. The mouth is of a middle size, and has a row of teeth in each jaw. The lateral line is very crooked at the beginning, but afterwards goes quite straight to the tail. The lower part of the body is white. This fish is best in season during the
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months of February, March, and April : they spawn in May and June, and remain flabby and watery all the rest of the summer. They are superior in goodness to both the plaice and flounder.

THE SMEAR D A B.

IT is about eighteen inches long and eleven wide, between fin and fin, on the widest part. The head appears very small ; the dorsal fin beginning very near its mouth, and extending almost to the tail. The eyes are very near each other, and the mouth is full of small teeth. The back, which is covered with small smooth scales, is of a light brown colour, spotted obscurely with yellow. The belly is white, and marked with five large dusky spots. The flesh of the smear-dab is equal in goodness to that of the common dab.

THE FLOUNDER.

THE flounder is easily distinguished from the plaice, or any other fish of this genus, by a row of sharp small spines or prickles, that surrounds its upper sides, and are placed just at the junction of the

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fins with the body. Another row marks the side-line, and runs half-way down the back. The scales, which are exceeding small, stick so close to the skin, that there seems to be no roughness. This fish has a small mouth, a narrow tongue, and a row of teeth in each jaw. It greatly resembles the plaice in shape; but the body is somewhat longer and thicker. It inhabits every part of the British sea, and even frequents our rivers which communicate with the sea; and though it does not grow large in our fresh-water streams, it is reckoned sweeter than those which live in the ocean. It does not grow so large as the plaice, and is hardly ever seen to exceed six pounds in weight. The colour of the upper part of the body is a pale brown, and frequently marked with a few obscure spots of dirty yellow: the belly is white.

Flounders are in season all the year, except in June and July, which is their time of spawning, and then they are sick and flabby, and infested with worms which breed on their backs. The flesh is white, soft, innocent, and nourishing; but it is always best when it is most firm. The taste of it greatly resembles

that of the plaice, from which it differs but little in any respect.

It is the nature of all flat fish to lie and feed at the bottom ; some indeed are fond of mud, but the flounders avoid it as much as possible, delighting to lie on sandy or gravelly bottoms, especially on the declivity of a deep hole, near a bank, and in an eddy.

They may be angled for either with a float or a running bullet, but the latter is preferable. The bullet should rest at least a foot from the hook, that the bait may be at liberty to be put in motion by the water. If you use a float, let it lie flat on the water, and when you perceive it to move along slowly, and soon after become upright, then strike, and you will be sure of your prey. But always remember, that he is some time in sucking the bait into his mouth before he gorges it.

The best baits are red worms, or very small marsh-worms put on a small hook. You should bait the ground with a handful of small red-worms cut in two pieces. They may be angled for all the day, but early in the morning is the best time. He likewise takes earth-bobs very well.

In

In the hot months, there are great quantities caught with the fluke-rake. The method is to get one about two yards long, and go to the shallow parts of the water where it is the most sandy, and as you go along, keep thrusting the rake into the sand, which you may easily do, by setting one foot upon the frame, and when you have caught one you will easily perceive it by the rake's grasping as the forks enter his back. This method is only used in the tide's way after it is gone down.

THE SOLE.

THIS is a longish flat fish, resembling the sole of a shoe in shape, from whence it has its name. It is found on all our coasts, but those on the western shores are much superior in size to those of the north. On the western coasts they are sometimes taken of the weight of five or six pounds; but towards Scarborough they seldom exceed one pound; and one of two pounds is reckoned an uncommon fish. The upper part is of a dark ash-colour, and the lower part white: it is covered with rough scales. The lateral line passes directly from the head to

the tail, thro' the middle of both sides. The corners of the mouth are rough, having a kind of small bristles or hairs : the body is surrounded with short fins, which begin near the eyes, and extend almost to the tail. The eyes are small, round, and covered with a loose skin : the irides are yellow, and the pupils of the eye are of a bright sappharine colour : the tail is rounded at the end.

The sole is a fish of a very delicate flavour ; but the large soles are much inferior in goodness to the small ones. The chief fishery for them is at Blixham, and in Torbay. About twelve or fourteen years ago, Mr. Blake, a gentleman of great probity and fortune, took indefatigable pains to reduce the price of this delicious fish, by contriving a method of bringing them to London by land-carriage ; and though his scheme did not meet with that success it merited, and was opposed by the whole trade of mercenary fishmongers, yet the plan appears now to be in a great measure adopted by the fishmongers themselves ; and soles are now to be purchased of them at about half the price they were usually sold at, before Mr. Blake projected his plan.

By

By the antient laws of the Cinque Ports, a penalty was inflicted upon every person who should take soles from the first of November to the fifteenth of March ; also upon every person who should fish for them from sun-setting to sun-rising.

There is a species called the smooth sole, which is very scarce, and found chiefly about Cornwall. It is extremely thin, white, and transparent ; and, on that account, is sometimes called the lantern fish.

THE TURBOT.

IN the northern part of England this fish is called a brett : it grows to a very large size ; and sometimes, though very rarely, is found to weigh thirty pounds. It is the largest of all this kind, the holibut excepted. These fish are taken chiefly off the north coast of England, and others off the Dutch coast ; but we believe the last has, in many instances, more credit than it deserves for the abundance of its fish. They have no scales, but a rough spotted skin, full of exceeding small prickles, placed without order on the upper part of the body.

The

The large turbot, and several other kinds of flat fish, are taken by the hook and line, for they lie in deep water: the method of taking them in wares, or staked nets, is too precarious to be depended on for the supply of our great markets, because it is by meer accident that the great fish stray into them.

Mr. Pennant furnishes us with the following method of fishing for turbot, cod, ling, scates, &c. The inhabitants of many of our fishing coasts, says he, especially those of the north part of North Wales, are unacquainted with the most successful means of capture: for their benefit, and perhaps that of other parts of our island, we shall lay before them the method practised by the fishermen of Scarborough.

When they go out to fish, each person is provided with three lines. Each man's lines are fairly coiled upon a flat piece of wicker-work; the hooks being baited, and placed very regularly in the center of the coil. Each line is furnished with fourteen score of hooks, at the distance of six feet two inches from each other. The hooks are fastened to the lines upon heads of twisted horse-hair, twenty-seven inches in length.

When

When fishing there are always three men in each coble, and consequently nine of these lines are fastened together, and used as one line, extending in length near three miles, and furnished with two thousand five hundred and twenty hooks. An anchor and a buoy are fixed at the first end of the line, and one more of each at the end of each man's lines; in all four anchors, which are commonly perforated stones, and four buoys made of leather or cork. The line is always laid across the current. The tides of flood and ebb continue an equal time upon our coast, and when undisturbed by winds run each way about six hours. They are so rapid, that the fishermen can only shoot and haul their lines at the turn of tide; and therefore the lines always remain upon the ground about six hours. The same rapidity of tide prevents their using hand-lines; and therefore two of the people commonly wrap themselves in the sail, and sleep while the other keeps a strict look-out, for fear of being run down by ships, and to observe the weather. For storms often rise so suddenly, that it is with extreme difficulty they can sometimes escape to the shore, leaving their lines behind.

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The

The coble is twenty feet six inches long, and five feet its extreme breadth. It is about one ton burthen, rowed with three pair of oars, and admirably constructed for the purpose of encountering a mountainous sea: they hoist sail when the wind suits.

The five men boat is forty feet long and fifteen broad, and of twenty-five tons burthen: it is so called, though navigated by six men and a boy, because one of the men is commonly hired to cook, &c. and does not share in the profits with the other five. All our able fishermen go in these boats to the herring-fishery at Yarmouth the latter end of September, and return about the middle of November. The boats are then laid up until the beginning of Lent, at which time they go off in them to the edge of the dogger, and other places, to fish for turbot, cod, ling, scates, &c. They always take two cables on board, and when they come upon their ground, anchor the boat, throw out the cobbles, and fish in the same manner as those who do go from the shore in a coble, with this difference only; that here each man is provided with double the quantity of lines, and instead of waiting the return
of

of tide in the coble, return to the boat and bait their other lines; thus hawling one set, and shooting another every turn of tide. They commonly run into harbour twice a week to deliver their fish. The five-men boat is decked at each end, but open in the middle, and has two large lug-sails.

The best baits for all kinds of fish is fresh herring cut in pieces of a proper size; and notwithstanding what has been said to the contrary, they are taken here at any time in the winter, and all the spring, whenever the fishermen put down their nets for that purpose. The five-men boats always take some nets for that end. Next to herrings are the lesser lampreys, which come all winter by land-carriage from Tadcaster. The next baits in esteem are small haddocks cut in pieces, sand-worms, muscles, and limpets (called here fleddets,) and lastly, when none of these can be had, they use bullock's liver. The hooks used here are much smaller than those employed at Iceland and Newfoundland. Experience has shewn, that the larger fish will take a living small one upon the hook, sooner than any bait can be put on; therefore they use such as the small fish can swallow.

low. The hooks are two inches and an half long in the shank, and near an inch wide between the shank and the point. The line is made of small cording, and is always tanned before it is used.

Turbots, and all the rays, are extremely delicate in their choice of baits. If a piece of herring or haddock has been twelve hours out of the sea, and then used as bait, they will not touch it.

Such is the manner of fishing for those fish that usually keep near the bottom on the coasts of England; and Duhamel observes, that the best weather for succeeding, is half calm, when the waves are just curled with a silent breeze.

END OF THE NINTH VOLUME.



